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Pest categorisation of non-EU viruses and viroids of *Cydonia* Mill., *Malus* Mill. and *Pyrus* L.

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Abstract

Following a request from the EU Commission, the Panel on Plant Health performed a pest categorisation of 17 viruses and viroids, herein called viruses, of *Cydonia* Mill., *Malus* Mill. and *Pyrus* L. determined as being either non-EU or of undetermined standing in a previous EFSA opinion. These viruses belong to different genera and are heterogeneous in their biology. They can be detected by available methods and are efficiently transmitted by vegetative propagation techniques, with plants for planting representing a major long-distance spread mechanism and, potentially, a major entry pathway. Depending on the viruses, additional pathway(s) can also be seed, pollen and/or vector transmission. Most of the viruses categorised here are known to infect only one of few related plant genera, but some of them have a wider host range, thus extending the possible entry pathways. Three viruses (apple necrotic mosaic virus, cherry rasp leaf virus, temperate fruit decay-associated virus) and one viroid (apple fruit crinkle viroid) satisfy all the criteria to be considered as Union quarantine pests. Five viruses (apple green crinkle-associated virus, blackberry chlorotic ringspot virus, eggplant mottled crinkle virus, tobacco ringspot virus and tomato ringspot virus) and one viroid (apple scar skin viroid), satisfy the criteria to be considered as Union quarantine pests with the possible exception of being absent from the EU territory or having a restricted presence and being under official control. The remaining six viruses (apple geminivirus, apple latent spherical virus, apple-associated luteovirus, *Pyrus pyrifolia* cryptic virus, *Pyrus pyrifolia* partitivirus 2 and Tulare apple mosaic virus) and one viroid (apple hammerhead viroid) were not found to satisfy one or more of these criteria. The Panel highlights that for several viruses, especially those recently discovered, the categorisation is associated with high uncertainties mainly linked to the absence of data on biology and distribution. Since this opinion addresses specifically the non-EU viruses, in general these viruses do not meet the criteria assessed by EFSA to qualify as a potential Union regulated non-quarantine pests.

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1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

1.1.1. Background

Council Directive 2000/29/EC¹ on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community establishes the present European Union plant health regime. The Directive lays down the phytosanitary provisions and the control checks to be carried out at the place of origin on plants and plant products destined for the Union or to be moved within the Union. In the Directive's 2000/29/EC annexes, the list of harmful organisms (pests) whose introduction into or spread within the Union is prohibited, is detailed together with specific requirements for import or internal movement.

Following the evaluation of the plant health regime, the new basic plant health law, Regulation (EU) 2016/2031² on protective measures against pests of plants, was adopted on 26 October 2016 and will apply from 14 December 2019 onwards, repealing Directive 2000/29/EC. In line with the principles of the above mentioned legislation and the follow-up work of the secondary legislation for the listing of EU regulated pests, EFSA is requested to provide pest categorizations of the harmful organisms included in the annexes of Directive 2000/29/EC, in the cases where recent pest risk assessment/pest categorisation is not available.

1.1.2. Terms of Reference

EFSA is requested, pursuant to Article 22(5.b) and Article 29(1) of Regulation (EC) No 178/2002³, to provide scientific opinion in the field of plant health.

EFSA is requested to prepare and deliver a pest categorisation (step 1 analysis) for each of the regulated pests included in the appendices of the annex to this mandate. The methodology and template of pest categorisation have already been developed in past mandates for the organisms listed in Annex II Part A Section II of Directive 2000/29/EC. The same methodology and outcome is expected for this work as well.

The list of the harmful organisms included in the annex to this mandate comprises 133 harmful organisms or groups. A pest categorisation is expected for these 133 pests or groups and the delivery of the work would be stepwise at regular intervals through the year as detailed below. First priority covers the harmful organisms included in Appendix 1, comprising pests from Annex II Part A Section I and Annex II Part B of Directive 2000/29/EC. The delivery of all pest categorisations for the pests included in Appendix 1 is June 2018. The second priority is the pests included in Appendix 2, comprising the group of *Cicadellidae* (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), the group of *Tephritidae* (non-EU), the group of potato viruses and virus-like organisms, the group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L. and the group of *Margarodes* (non-EU species). The delivery of all pest categorisations for the pests included in Appendix 2 is end 2019. The pests included in Appendix 3 cover pests of Annex I part A section I and all pests categorisations should be delivered by end 2020.

For the above mentioned groups, each covering a large number of pests, the pest categorisation will be performed for the group and not the individual harmful organisms listed under "such as" notation in the Annexes of the Directive 2000/29/EC. The criteria to be taken particularly under consideration for these cases, is the analysis of host pest combination, investigation of pathways, the damages occurring and the relevant impact.

Finally, as indicated in the text above, all references to 'non-European' should be avoided and replaced by 'non-EU' and refer to all territories with exception of the Union territories as defined in Article 1 point 3 of Regulation (EU) 2016/2031.

¹ Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. OJ L 169/1, 10.7.2000, p. 1–112.

² Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants. OJ L 317, 23.11.2016, p. 4–104.

³ Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31/1, 1.2.2002, p. 1–24.

1.1.2.1. Terms of Reference: Appendix 1

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

<i>Aleurocantus</i> spp.	<i>Numonia pyrivorella</i> (Matsumura)
<i>Anthonomus bisignifer</i> (Schenkling)	<i>Oligonychus perditus</i> Pritchard and Baker
<i>Anthonomus signatus</i> (Say)	<i>Pissodes</i> spp. (non-EU)
<i>Aschistonyx eppoi</i> Inouye	<i>Scirtothrips aurantii</i> Faure
<i>Carposina niponensis</i> Walsingham	<i>Scirtothrips citri</i> (Moultx)
<i>Enarmonia packardi</i> (Zeller)	<i>Scolytidae</i> spp. (non-EU)
<i>Enarmonia prunivora</i> Walsh	<i>Scrobipalopsis solanivora</i> Povolny
<i>Grapholita inopinata</i> Heinrich	<i>Tachypterellus quadrigibbus</i> Say
<i>Hishomonus phycitis</i>	<i>Toxoptera citricida</i> Kirk.
<i>Leucaspis japonica</i> Ckll.	<i>Unaspis citri</i> Comstock
<i>Listronotus bonariensis</i> (Kuschel)	

(b) Bacteria

Citrus variegated chlorosis	<i>Xanthomonas campestris</i> pv. <i>oryzae</i> (Ishiyama) Dye and
<i>Erwinia stewartii</i> (Smith) Dye	pv. <i>oryzicola</i> (Fang, et al.) Dye

(c) Fungi

<i>Alternaria alternata</i> (Fr.) Keissler (non-EU pathogenic isolates)	<i>Elsinoe</i> spp. Bitanc. and Jenk. Mendes
<i>Anisogramma anomala</i> (Peck) E. Müller	<i>Fusarium oxysporum</i> f. sp. <i>albedinis</i> (Kilian and Maire) Gordon
<i>Apiosporina morbosa</i> (Schwein.) v. Arx	<i>Guignardia piricola</i> (Nosa) Yamamoto
<i>Ceratocystis virescens</i> (Davidson) Moreau	<i>Puccinia pittieriana</i> Hennings
<i>Cercoseptoria pini-densiflorae</i> (Hori and Nambu) Deighton	<i>Stegophora ulmea</i> (Schweinitz: Fries) Sydow & Sydow
<i>Cercospora angolensis</i> Carv. and Mendes	<i>Venturia nashicola</i> Tanaka and Yamamoto

(d) Virus and virus-like organisms

Beet curly top virus (non-EU isolates)	Little cherry pathogen (non- EU isolates)
Black raspberry latent virus	Naturally spreading psorosis
Blight and blight-like	Palm lethal yellowing mycoplasma
Cadang-Cadang viroid	Satsuma dwarf virus
Citrus tristeza virus (non-EU isolates)	Tatter leaf virus
Leprosis	Witches' broom (MLO)

Annex IIB

(a) Insect mites and nematodes, at all stages of their development

<i>Anthonomus grandis</i> (Boh.)	<i>Ips cembrae</i> Heer
<i>Cephalcia lariciphila</i> (Klug)	<i>Ips duplicatus</i> Sahlberg
<i>Dendroctonus micans</i> Kugelán	<i>Ips sexdentatus</i> Börner
<i>Gilpinia hercyniae</i> (Hartig)	<i>Ips typographus</i> Heer
<i>Gonipterus scutellatus</i> Gyll.	<i>Sternochetus mangiferae</i> Fabricius
<i>Ips amitinus</i> Eichhof	

(b) Bacteria

<i>Curtobacterium flaccumfaciens</i> pv. <i>flaccumfaciens</i> (Hedges) Collins and Jones

(c) Fungi*Glomerella gossypii* Edgerton*Hypoxyton mammatum* (Wahl.) J. Miller*Gremmeniella abietina* (Lag.) Morelet**1.1.2.2. Terms of Reference: Appendix 2**

List of harmful organisms for which pest categorisation is requested per group. The list below follows the categorisation included in the annexes of Directive 2000/29/EC.

Annex IAI**(a) Insects, mites and nematodes, at all stages of their development**

Group of Cicadellidae (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), such as:

- | | |
|--|---|
| 1) <i>Carneocephala fulgida</i> Nottingham | 3) <i>Graphocephala atropunctata</i> (Signoret) |
| 2) <i>Draeculacephala minerva</i> Ball | |

Group of Tephritidae (non-EU) such as:

- | | |
|--|---|
| 1) <i>Anastrepha fraterculus</i> (Wiedemann) | 12) <i>Pardalaspis cyanescens</i> Bezzi |
| 2) <i>Anastrepha ludens</i> (Loew) | 13) <i>Pardalaspis quinaria</i> Bezzi |
| 3) <i>Anastrepha obliqua</i> Macquart | 14) <i>Pterandrus rosa</i> (Karsch) |
| 4) <i>Anastrepha suspensa</i> (Loew) | 15) <i>Rhacochlaena japonica</i> Ito |
| 5) <i>Dacus ciliatus</i> Loew | 16) <i>Rhagoletis completa</i> Cresson |
| 6) <i>Dacus curcurbitae</i> Coquillett | 17) <i>Rhagoletis fausta</i> (Osten-Sacken) |
| 7) <i>Dacus dorsalis</i> Hendel | 18) <i>Rhagoletis indifferens</i> Curran |
| 8) <i>Dacus tryoni</i> (Froggatt) | 19) <i>Rhagoletis mendax</i> Curran |
| 9) <i>Dacus tsuneonis</i> Miyake | 20) <i>Rhagoletis pomonella</i> Walsh |
| 10) <i>Dacus zonatus</i> Saund. | 21) <i>Rhagoletis suavis</i> (Loew) |
| 11) <i>Epochra canadensis</i> (Loew) | |

(c) Viruses and virus-like organisms

Group of potato viruses and virus-like organisms such as:

- | | |
|----------------------------------|--|
| 1) Andean potato latent virus | 4) Potato black ringspot virus |
| 2) Andean potato mottle virus | 5) Potato virus T |
| 3) Arracacha virus B, oca strain | 6) non-EU isolates of potato viruses A, M, S, V, X and Y (including Yo, Yn and Yc) and Potato leafroll virus |

Group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L., such as:

- | | |
|--------------------------------------|--|
| 1) Blueberry leaf mottle virus | 8) Peach yellows mycoplasma |
| 2) Cherry rasp leaf virus (American) | 9) Plum line pattern virus (American) |
| 3) Peach mosaic virus (American) | 10) Raspberry leaf curl virus (American) |
| 4) Peach phony rickettsia | 11) Strawberry witches' broom mycoplasma |
| 5) Peach rosette mosaic virus | 12) Non-EU viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L. |
| 6) Peach rosette mycoplasma | |
| 7) Peach X-disease mycoplasma | |

Annex IIAI**(a) Insects, mites and nematodes, at all stages of their development**

Group of *Margarodes* (non-EU species) such as:

- | | |
|--|--|
| 1) <i>Margarodes vitis</i> (Phillipi) | 3) <i>Margarodes prieskaensis</i> Jakubski |
| 2) <i>Margarodes vredendalensis</i> de Klerk | |

1.1.2.3. Terms of Reference: Appendix 3

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

<i>Acleris</i> spp. (non-EU)	<i>Longidorus diadecturus</i> Eveleigh and Allen
<i>Amauromyza maculosa</i> (Malloch)	<i>Monochamus</i> spp. (non-EU)
<i>Anomala orientalis</i> Waterhouse	<i>Myndus crudus</i> Van Duzee
<i>Arrhenodes minutus</i> Drury	<i>Nacobbus aberrans</i> (Thorne) Thorne and Allen
<i>Choristoneura</i> spp. (non-EU)	<i>Naupactus leucoloma</i> Boheman
<i>Conotrachelus nenuphar</i> (Herbst)	<i>Premnotrypes</i> spp. (non-EU)
<i>Dendrolimus sibiricus</i> Tschetverikov	<i>Pseudopityophthorus minutissimus</i> (Zimmermann)
<i>Diabrotica barberi</i> Smith and Lawrence	<i>Pseudopityophthorus pruinosus</i> (Eichhoff)
<i>Diabrotica undecimpunctata howardi</i> Barber	<i>Scaphoideus luteolus</i> (Van Duzee)
<i>Diabrotica undecimpunctata undecimpunctata</i> Mannerheim	<i>Spodoptera eridania</i> (Cramer)
<i>Diabrotica virgifera zea</i> Krysan & Smith	<i>Spodoptera frugiperda</i> (Smith)
<i>Diaphorina citri</i> Kuway	<i>Spodoptera litura</i> (Fabricius)
<i>Heliothis zea</i> (Boddie)	<i>Thrips palmi</i> Karny
<i>Hirschmanniella</i> spp., other than <i>Hirschmanniella</i> <i>gracilis</i> (de Man) Luc and Goodey	<i>Xiphinema americanum</i> Cobb <i>sensu lato</i> (non-EU populations)
<i>Liriomyza sativae</i> Blanchard	<i>Xiphinema californicum</i> Lamberti and Bleve-Zacheo

(b) Fungi

<i>Ceratocystis fagacearum</i> (Bretz) Hunt	<i>Mycosphaerella larici-leptolepis</i> Ito et al.
<i>Chrysomyxa arctostaphyli</i> Dietel	<i>Mycosphaerella populorum</i> G. E. Thompson
<i>Cronartium</i> spp. (non-EU)	<i>Phoma andina</i> Turkensteen
<i>Endocronartium</i> spp. (non-EU)	<i>Phyllosticta solitaria</i> Ell. and Ev.
<i>Guignardia laricina</i> (Saw.) Yamamoto and Ito	<i>Septoria lycopersici</i> Speg. var. <i>malagutii</i> Ciccarone and Boerema
<i>Gymnosporangium</i> spp. (non-EU)	<i>Thecaphora solani</i> Barrus
<i>Inonotus weirii</i> (Murril) Kotlaba and Pouzar	<i>Trechispora brinkmannii</i> (Bresad.) Rogers
<i>Melampsora farlowii</i> (Arthur) Davis	

(c) Viruses and virus-like organisms

Tobacco ringspot virus	Pepper mild tigré virus
Tomato ringspot virus	Squash leaf curl virus
Bean golden mosaic virus	Euphorbia mosaic virus
Cowpea mild mottle virus	Florida tomato virus
Lettuce infectious yellows virus	

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

<i>Meloidogyne fallax</i> Karssen	<i>Rhizoecus hibisci</i> Kawai and Takagi
<i>Popillia japonica</i> Newman	

(b) Bacteria

Clavibacter michiganensis (Smith) Davis et al. ssp. *Ralstonia solanacearum* (Smith) Yabuuchi et al.
sepedonicus (Spieckermann and Kotthoff) Davis et al.

(c) Fungi

Melampsora medusae Thümen *Synchytrium endobioticum* (Schilbersky) Percival

Annex I B**(a) Insects, mites and nematodes, at all stages of their development**

Leptinotarsa decemlineata Say *Liriomyza bryoniae* (Kaltenbach)

(b) Viruses and virus-like organisms

Beet necrotic yellow vein virus

1.2. Interpretation of the Terms of Reference

Non-EU viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L. are pests listed in the Appendices to the Terms of Reference (ToR) to be subject to pest categorisation to determine whether they fulfil the criteria of quarantine pests or those of regulated non-quarantine pests for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States (MSs) referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores.

The EFSA PLH Panel decided to address the pest categorisation of this large group of infectious agents in several steps, the first of which has been to list non-EU viruses and viroids (viruses and viroids, although different biological categories, are summarised together as 'viruses' in the rest of this opinion) of *Cydonia*, *Fragaria*, *Malus*, *Prunus*, *Pyrus*, *Ribes*, *Rubus* and *Vitis* (EFSA PLH Panel, 2019).

The process has been detailed in a recent Scientific Opinion (EFSA PLH Panel, 2019), in which it has also been clarified that *In the process, three groups of viruses were distinguished: non-EU viruses, viruses with significant presence in EU (known to occur in several MSs, frequently reported in the EU, widespread in several MSs) or so far reported only from the EU, and viruses with undetermined standing for which available information did not readily allow to allocate to one or the other of the two above groups. A non-EU virus is defined by its geographical origin outside of the EU territory. As such, viruses not reported from the EU and occurring only outside of the EU territory are considered as non-EU viruses. Likewise, viruses occurring outside the EU and having only a limited presence in the EU (reported in only one or few MSs, with restricted distribution, outbreaks) are also considered as non-EU. This opinion provides the methodology and results for this classification which precedes but does not prejudice the actual pest categorisation linked with the present mandate. This means that the Panel will then perform pest categorisations for the non-EU viruses and for those with undetermined standing. The viruses with significant presence in the EU or so far reported only from the EU will be also listed, but they will be excluded from the current categorisation efforts. The Commission at any time may present a request to EFSA to categorise some or all the viruses excluded from the current EFSA categorisation.* The same statements and definitions reported above also apply to the current opinion.

Due to the high number of the infectious agents to be categorised (a total of 101 viruses) and their heterogeneity in biology, host range and epidemiology, the EFSA PLH Panel established the need of finalising the pest categorisation in separate opinions by grouping non-EU viruses (a total of 87) and viruses with undetermined standing (14 viruses) according to the host crops. This strategy has the advantage of reducing the number of infectious agents to be considered in each opinion and appears more convenient for the stakeholders that will find grouped in a single opinion the categorisation of the non-EU viruses and those with undetermined standing infecting one or few specific crops. According to this decision, the current opinion covers the pest categorisation of the viruses and viroids of *Cydonia*, *Malus* and *Pyrus* that have been listed as non-EU viruses or as viruses with undetermined standing (13 and 4 viruses, respectively) in the previous EFSA scientific opinion (EFSA PLH Panel, 2019) (see Table 1).

Table 1: Non-EU viruses and viruses with undetermined standing of *Cydonia*, *Malus* and *Pyrus*

Non-EU	Apple fruit crinkle viroid (AFCVd), apple geminivirus (AGV), apple green crinkle-associated virus (AGCaV), apple latent spherical virus (ALSV), apple necrotic mosaic virus (ApNMV), apple-associated luteovirus (AaLV), cherry rasp leaf virus (CRLV), <i>Pyrus pyrifolia</i> cryptic virus (PpCV), <i>Pyrus pyrifolia</i> partitivirus 2 (PpPV-2), temperate fruit decay-associated virus (TFDaV), tobacco ringspot virus (TRSV), tomato ringspot virus (ToRSV), tulare apple mosaic virus (TAMV)
Undetermined standing	Apple scar skin viroid (ASSVd), apple hammerhead viroid (AHVd), blackberry chlorotic ringspot virus (BCRV), eggplant mottled crinkle virus (EMCV)

Viruses of *Fragaria*, *Prunus*, *Ribes*, *Rubus* and *Vitis* will be addressed in other opinions. Virus-like diseases of unknown aetiology or diseases caused by phytoplasmas and other graft-transmissible bacteria are not addressed in this opinion.

2. Data and methodologies

2.1. Data

2.1.1. Literature search

A literature search on viruses of *Cydonia*, *Malus* and *Pyrus* was conducted at the beginning of the categorisation in the ISI Web of Science bibliographic database, using the scientific name of the pest as search term. Relevant papers were reviewed and further references and information were obtained from experts, as well as from citations within the references and grey literature. When the collected information was considered sufficient to perform the virus categorisation, the literature search was not further extended; as a consequence, the data provided here for each virus are not necessarily exhaustive.

2.1.2. Database search

Pest information, on host(s) and distribution, was retrieved from the European and Mediterranean Plant Protection Organization Global Database (EPPO, 2018a) and relevant publications. When the information from these sources was limited, it has been integrated with data from CABI crop protection compendium (CABI, 2018; <https://www.cabi.org/cpc/>). The database Fauna Europaea (de Jong et al., 2014; <https://fauna-eu.org>) has been used to search for additional information on the distribution of vectors, especially when data were not available in EPPO and/or CABI.

Data about the import of commodity types that could potentially provide a pathway for a pest to enter the EU and about the area of hosts grown in the EU were obtained from EUROSTAT (Statistical Office of the European Communities).

The Europhyt database was consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network run by the Directorate General for Health and Food Safety (DG SANTÉ) of the European Commission, and is a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant health information. The Europhyt database manages notifications of interceptions of plants or plant products that do not comply with EU legislation, as well as notifications of plant pests detected in the territory of the MSs and the phytosanitary measures taken to eradicate or avoid their spread.

Information on taxonomy of viruses and viroids was gathered from the Virus Taxonomy: 2018 Release (<https://talk.ictvonline.org/taxonomy/>), an updated official classification by the International Committee on Taxonomy of Viruses (ICTV). Information on the taxonomy of viruses not yet included in that ICTV classification was gathered from the primary literature source describing them. According to ICTV rules (<https://talk.ictvonline.org/information/w/faq/386/how-to-write-a-virus-name>), names of viruses are not italicised in the present opinion.

2.2. Methodologies

The Panel performed the pest categorisation for viruses of *Cydonia*, *Malus* and *Pyrus*, following guiding principles and steps presented in the EFSA guidance on quantitative pest risk assessment (EFSA PLH Panel, 2018b) and as defined in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004).

This work was initiated following an evaluation of the EU plant health regime. Therefore, to facilitate the decision-making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for a Union quarantine pest and for a Union regulated non-quarantine pest in accordance with Regulation (EU) 2016/2031 on protective measures against pests of plants, and includes additional information required in accordance with the specific terms of reference received by the European Commission. In addition, for each conclusion, the Panel provides a short description of its associated uncertainty.

Table 2 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. All relevant criteria have to be met for the pest to potentially qualify either as a quarantine pest or as a regulated non-quarantine pest. If one of the criteria is not met, the pest will not qualify. A pest that does not qualify as a quarantine pest may still qualify as a regulated non-quarantine pest that needs to be addressed in the opinion. For the pests regulated in the protected zones only, the scope of the categorisation is the territory of the protected zone; thus, the criteria refer to the protected zone instead of the EU territory.

It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regard to the principle of separation between risk assessment and risk management (EFSA founding regulation (EU) No 178/2002); therefore, instead of determining whether the pest is likely to have an unacceptable impact, the Panel will present a summary of the observed pest impacts. Economic impacts are expressed in terms of yield and quality losses and not in monetary terms, whereas addressing social impacts is outside the remit of the Panel.

Table 2: Pest categorisation criteria under evaluation, as defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Identity of the pest (Section 3.1)	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?
Absence/presence of the pest in the EU territory (Section 3.2)	Is the pest present in the EU territory? If present, is the pest widely distributed within the EU? Describe the pest distribution briefly!	Is the pest present in the EU territory? If not, it cannot be a protected zone quarantine organism	Is the pest present in the EU territory? If not, it cannot be a regulated non-quarantine pest. (A regulated non-quarantine pest must be present in the risk assessment area)
Regulatory status (Section 3.3)	If the pest is present in the EU but not widely distributed in the risk assessment area, it should be under official control or expected to be under official control in the near future	The protected zone system aligns with the pest free area system under the International Plant Protection Convention (IPPC) The pest satisfies the IPPC definition of a quarantine pest that is not present in the risk assessment area (e.g. protected zone)	Is the pest regulated as a quarantine pest? If currently regulated as a quarantine pest, are there grounds to consider its status could be revoked?
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways!	Is the pest able to enter into, become established in, and spread within, the protected zone areas? Is entry by natural spread from EU areas where the pest is present possible?	Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects? Clearly state if plants for planting is the main pathway!

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?	Would the pests' introduction have an economic or environmental impact on the protected zone areas?	Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Available measures (Section 3.6)	Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?	Are there measures available to prevent the entry into, establishment within or spread of the pest within the protected zone areas such that the risk becomes mitigated? Is it possible to eradicate the pest in a restricted area within 24 months (or a period longer than 24 months where the biology of the organism so justifies) after the presence of the pest was confirmed in the protected zone?	Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria assessed by EFSA above for consideration as potential protected zone quarantine pest were met, and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential regulated non-quarantine pest were met, and (2) if not, which one(s) were not met

The Panel will not indicate in its conclusions of the pest categorisation whether to continue the risk assessment process, but following the agreed two-step approach, will continue only if requested by the risk managers. However, during the categorisation process, experts may identify key elements and knowledge gaps that could contribute significant uncertainty to a future assessment of risk. It would be useful to identify and highlight such gaps so that potential future requests can specifically target the major elements of uncertainty, perhaps suggesting specific scenarios to examine.

3. Pest categorisation

3.1. Identity and biology of the pests

3.1.1. Identity and taxonomy

Is the identity of the pests established, or have they been shown to produce consistent symptoms and to be transmissible? (Yes or No)

Yes, the viruses of *Cydonia*, *Malus* and *Pyrus* categorised in the present opinion are either classified as species in the official ICTV classification scheme, or if not yet officially classified, have been proposed as tentative new species based on the unambiguous description of their molecular and/or biological features.

In Table 3, the information on the identity of the viruses categorised in the present opinion is reported. Eight viruses are included in the ICTV official classification scheme and therefore no uncertainty is associated to their identity. Nine viruses have not been yet officially classified, in general because they have been recently discovered. However, molecular and/or biological features of these viruses allowed proposing their tentative classification as novel species in either established or new genera, thus recognising them as infectious entities different from those previously reported. Therefore, also for viruses belonging to tentative species there is no uncertainty on their identity, although a limited uncertainty remains on their final taxonomic assignment. For two viruses (PpCV and

PpPV-2) recently discovered by next generation sequencing (NGS) (Osaki et al., 2017; Osaki and Sasaki, 2018), it is uncertain if they infect plants. These viruses have been proposed as new member species of the family *Partitiviridae*, which includes viruses infecting plants or fungi, but data confirming that the actual PpCV and PpPV-2 hosts are plants (and not plant-associated fungi) have not been provided.

Table 3: Identity of viruses and viroids categorised in the present opinion

VIRUS/VIROID name^(a)	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Justification^(b)
Apple fruit crinkle viroid (AFCVd)	Yes	Tentative species in the genus <i>Apscaviroid</i> , family <i>Pospiviroidae</i> (https://talk.ictvonline.org/ictv-reports/ictv_9th_report/sub-viral-agents-2011/w/sub_viruses/306/pospiviroidae)
Apple scar skin viroid (ASSVd)	Yes	Approved species in the genus <i>Apscaviroid</i> , family <i>Pospiviroidae</i>
Apple hammerhead viroid (AHVd)	Yes	Tentative species in the genus <i>Pelamoviroid</i> , family <i>Avsunviroidae</i> (Serra et al., 2018)
Apple geminivirus (AGV)	Yes	Tentative species in the family <i>Geminiviridae</i> (Liang et al., 2015)
Apple green crinkle-associated virus (AGCaV)	Yes	Tentative species in the genus <i>Foveavirus</i> , family <i>Betaflexiviridae</i> (James et al., 2013)
Apple latent spherical virus (ALSV)	Yes	Approved species in the genus <i>Cheravirus</i> , family <i>Secoviridae</i>
Apple necrotic mosaic virus (ApNMV)	Yes	Tentative species in the genus <i>Ilarvirus</i> , family <i>Bromoviridae</i> (Noda et al., 2017)
Apple-associated luteovirus (AaLV)	Yes	Tentative species in the genus <i>Luteovirus</i> , family <i>Luteoviridae</i> (Shen et al., 2018)
Blackberry chlorotic ringspot virus (BCRV)	Yes	Approved species in the genus <i>Ilarvirus</i> , family <i>Bromoviridae</i>
Cherry rasp leaf virus (CRLV)	Yes	Approved species in genus <i>Cheravirus</i> , family <i>Secoviridae</i>
Eggplant mottled crinkle virus (EMCV)	Yes	Approved species in the genus <i>Tombusvirus</i> , family <i>Tombusviridae</i>
Pyrus pyrifolia cryptic virus (PpCV)	Yes	Tentative species in the genus <i>Deltapartivirus</i> , family <i>Partitiviridae</i> (Osaki et al., 2017)
Pyrus pyrifolia partitivirus 2 (PpPV-2)	Yes	Tentative species in the genus <i>Alphapartivirus</i> , family <i>Partitiviridae</i> (Osaki and Sasaki, 2018)
Temperate fruit decay-associated virus (TFDaV)	Yes	Tentative species in a tentative new genus or family of ssDNA viruses (Basso et al., 2015)
Tobacco ringspot virus (TRSV)	Yes	Approved species in the genus <i>Nepovirus</i> , family <i>Secoviridae</i>
Tomato ringspot virus (ToRSV)	Yes	Approved species in the genus <i>Nepovirus</i> , family <i>Secoviridae</i>
Tulare apple mosaic virus (TAMV)	Yes	Approved species in the genus <i>Ilarvirus</i> , family <i>Bromoviridae</i>

(a): According to ICTV rules (<https://talk.ictvonline.org/information/w/faq/386/how-to-write-a-virus-name>), names of viruses are not italicised.

(b): Tentative species refers to a proposed novel virus/viroid species not yet approved by ICTV.

3.1.2. Biology of the pests

All the viruses considered in the present pest categorisation are efficiently transmitted by vegetative propagation techniques. Some of them may possibly be mechanically transmitted by contaminated tools and/or injuries but this process is generally considered to be at best inefficient in woody hosts, such as *Cydonia*, *Malus* and *Pyrus* species. Some of these agents have additional natural transmission mechanisms as outlined in Table 4.

Table 4: Seed-, pollen- and vector-mediated transmission of the categorised viruses with the associated uncertainty

VIRUS/ VIROID name	Seed transmission	Seed transmission uncertainty (refs)	Pollen transmission	Pollen transmission uncertainty (refs)	Vector transmission	Vector transmission uncertainty (refs)
Apple fruit crinkle viroid (AFCVd)	No	Not known for AFCVd or for apscaviroids with the possible exception of ASSVd (see below)	No	Not known for AFCVd and apscaviroids are not reported as pollen transmitted	No	Not known for AFCVd. With the possible exception of ASSVd (see below), apscaviroids are not known to be vector-transmitted
Apple scar skin viroid (ASSVd)	Yes	Conflicting reports (Hadidi et al., 2017) generate uncertainty on this statement	No	Not known for ASSVd and apscaviroids are not reported as pollen transmitted	Cannot be excluded	Uncertainty derives from one report documenting ASSVd transmission between experimental herbaceous hosts mediated by <i>Trialeurodes vaporariorum</i> (Walia et al., 2015) Transmission of ASSVd to its natural woody hosts has never been documented and would appear unlikely
Apple hammer head viroid (AHVd)	Cannot be excluded	Not known for AHVd, but members of the genus/family in which AHVd will likely be classified are seed-transmitted (Hammond, 2017)	Cannot be excluded	Not known for AHVd, but members of the genus/family in which AHVd will likely be classified are pollen-transmitted (Barba et al., 2007; Hammond, 2017)	Cannot be excluded	Not known for AHVd, but there is one report on aphid-transmission of PLMVd (Desvignes, 1976), a member of the genus in which AHVd will likely be classified

VIRUS/ VIROID name	Seed transmission	Seed transmission uncertainty (refs)	Pollen transmission	Pollen transmission uncertainty (refs)	Vector transmission	Vector transmission uncertainty (refs)
Apple gemini virus (AGV)	No	Not known for AGV and member of family <i>Geminiviridae</i> are very generally not reported as seed-transmitted	No	Not known for AGV and member of family <i>Geminiviridae</i> are very generally not reported as pollen-transmitted	Cannot be excluded	Not known for AGV, but <i>Geminiviridae</i> are very generally transmitted by insects (Rojas et al., 2018)
Apple green crinkle- associated virus (AGCaV)	No	Not known for AGCaV and foveaviruses are not known to be seed-transmitted	No	Not known for AGCaV and foveaviruses are not known to be pollen-transmitted	No	Not known for AGCaV and foveaviruses are not known to be vector-transmitted
Apple latent spherical virus (ALSV)	Yes	No uncertainty (Nakamura et al., 2011)	Cannot be excluded	One experimental report of pollen-transmission. pollen from infected trees is highly infected but no or very low transmission reported (Nakamura et al., 2011)	Cannot be excluded	Not known for ALSV but other cheraviruses are known to be transmitted by nematodes (EFSA PLH Panel, 2018a)
Apple necrotic mosaic virus (ApNMV)	Cannot be excluded	Not known for ApNMV but other ilarviruses are seed-transmitted (Pallas et al., 2013)	Cannot be excluded	Not known for ApNMV but other ilarviruses are pollen-transmitted (Pallas et al., 2013)	No	Not known for ApNMV. No known vector for other ilarviruses, however pollen-transmission is known to be facilitated by thrips (Greber et al., 1992; Sdoodee and Teakle, 1993; Klose et al., 1996)
Apple- associated luteovirus (AaLV)	No	Not known for AaLV, luteoviruses are very generally not reported as seed-transmitted (Mink, 1993)	No	Not known for AaLV, luteoviruses are very generally not reported as pollen-transmitted (Mink, 1993)	Cannot be excluded	Not known for AaLV, but luteoviruses are very generally transmitted by aphids (Gray and Gildow, 2003)

VIRUS/ VIROID name	Seed transmission	Seed transmission uncertainty (refs)	Pollen transmission	Pollen transmission uncertainty (refs)	Vector transmission	Vector transmission uncertainty (refs)
Blackberry chlorotic ringspot virus (BCRV)	Yes	No uncertainty (Poudel et al., 2014)	Yes	No uncertainty (Martin et al., 2013)	No	Not known for BCRV. No known vector for other ilarviruses, however pollen transmission is known to be facilitated by thrips (Greber et al., 1992; Sdoodee and Teakle, 1993; Klose et al., 1996)
Cherry rasp leaf virus (CRLV)	Yes	Reported in some herbaceous hosts but not reported in woody hosts (James, 2011; EFSA PLH Panel, 2013)	Yes	Reported in herbaceous hosts but not reported in woody hosts (James, 2011; EFSA PLH Panel, 2013)	Yes	No uncertainty. Known to be transmitted by <i>Xiphinema americanum</i> sensu lato (including <i>X. americanum</i> sensu stricto, <i>X. californicum</i> and <i>X. rivesi</i>) (Brown et al., 1993; James, 2011; EFSA PLH Panel, 2018a)
Eggplant mottled crinkle virus (EMCV)	Cannot be excluded	Not known for EMCV (Allen, 1969), but some tombusviruses are known to be seed-transmitted (Rochon et al., 2012)	No	Not known for EMCV and tombusviruses are very generally not reported as pollen-transmitted	Cannot be excluded	Not known for EMCV, but transmission of other tombusviruses is known to be mediated by <i>Olpidium</i> sp. (Campbell, 1996; Singh et al., 2008)
Pyrus pyrifolia cryptic virus (PpCV)	Cannot be excluded	Not known for PpCV (Nibert et al., 2014), but other members of family <i>Partitiviridae</i> are seed-transmitted (Ghabrial et al., 2012)	Cannot be excluded	Not known for PpCV (Nibert et al., 2014), but other members of family <i>Partitiviridae</i> are known to be pollen-transmitted (Ghabrial et al., 2012)	No	Not known for PpCV and deltapatitviruses are not known to be vector- transmitted

VIRUS/ VIROID name	Seed transmission	Seed transmission uncertainty (refs)	Pollen transmission	Pollen transmission uncertainty (refs)	Vector transmission	Vector transmission uncertainty (refs)
Pyrus pyrifolia partitivirus 2 (PpPV-2)	Cannot be excluded	Not known for PpPV-2 (Nibert et al., 2014), but other family <i>Partitiviridae</i> members are seed-transmitted (Ghabrial et al., 2012)	Cannot be excluded	Not known for PpPV-2 (Nibert et al., 2014), but other family <i>Partitiviridae</i> members are pollen-transmitted (Ghabrial et al., 2012)	No	Not known for PpPV-2 and alphapartitiviruses are not known to be vector- transmitted
Temperate fruit decay- associated virus (TFDaV)	Transmission mechanisms cannot be readily evaluated. No information is available on transmission of TFDaV and no close relative exists which could be used to propose a tentative evaluation on the basis of similarity					
Tobacco ringspot virus (TRSV)	Yes	Reported in herbaceous hosts. Not reported in woody hosts (EFSA PLH Panel, 2013)	Yes	Reported in herbaceous hosts. Not reported in woody hosts (EFSA PLH Panel, 2013)	Yes	Known to be transmitted by <i>Xiphinema americanum</i> sensu lato (including <i>X. americanum</i> sensu stricto, <i>X. californicum</i> , <i>X. rivesi</i> , <i>X. intermedium</i> , <i>X. tarjanense</i>) (EFSA PLH Panel, 2018a)
Tomato ringspot virus (ToRSV)	Yes	Reported in herbaceous hosts, but not reported in woody hosts (Sanfaçon and Fuchs, 2011; EFSA PLH Panel, 2013) (http:// sdb.im.ac.cn/ vide/descr836. htm)	Yes	Reported in herbaceous hosts, but not reported in woody hosts (Sanfaçon and Fuchs, 2011; EFSA PLH Panel, 2013) (http:// sdb.im.ac.cn/ vide/descr836. htm)	Yes	Known to be transmitted by <i>Xiphinema americanum</i> sensu lato (including <i>X. americanum</i> sensu stricto, <i>X. californicum</i> , <i>X. rivesi</i> , <i>X. intermedium</i> , <i>X. tarjanense</i> ; EFSA PLH Panel, 2018a)
Tulare apple mosaic virus (TAMV)	Cannot be excluded	Not known for TAMV (http:// www.dpvweb.ne t/dpv/showdpv. php?dpvno=42), but other ilarviruses are known to be seed-transmitted. (Pallas et al., 2013)	Cannot be excluded	Not known for TAMV (http:// www.dpvweb.ne t/dpv/showdpv. php?dpvno=42), but other ilarviruses are known to be pollen- transmitted. (Pallas et al., 2013)	No	Not known for TAMV (http:// www.dpvweb.net/ dpv/showdpv.php? dpvno=42), however transmission of some other ilarviruses is reported to be facilitated by thrips (Greber et al., 1992; Sdoodee and Teakle, 1993; Klose et al., 1996)

3.1.3. Intraspecific diversity

Viruses generally exist as quasi-species, which mean that they accumulate in a single host as a cluster of closely related sequence variants slightly differing from each other (Andino and Domingo, 2015). This is likely due to competition among the diverse genomic variants generated as a consequence of the error-prone viral replication system (higher in RNA than in DNA viruses) and the ensuing selection of the most fit variant distributions in a given environment (Domingo et al., 2012). This is also true for viroids (Di Serio et al., 2017a). This means that a certain level of intraspecific diversity is expected for all viruses. As an example, high intraspecific divergence has been observed in the X4 domain of the ToRSV RNA2 among different virus strains (Jafarpour and Sanfaçon, 2009; Rivera et al., 2016); substantial sequence diversity has also been reported in six ApNMV Chinese isolates (Xing et al., 2018). This genetic variability may interfere with the efficiency of detection methods, especially when they are based on amplification of variable genomic viral sequences, thus generating uncertainties on the reliability and/or sensitivity of the viral detection for all existing viral variants. For example, it has been shown that sequence diversity observed in AGCaV may impair detection of some isolates by some specific primers (James et al., 2013).

For several viruses categorised in this opinion, information on their genetic variability is available, but studies showing a correlation between specific virus populations or variants and biological features (e.g. host range, transmissibility, pathogenicity) are rare, thus also contributing to increase the uncertainties on the possible consequences of intraspecific genetic variability on the virus biology. In the case of TRSV, several variants from different natural hosts have been reported (Stace-Smith, 1985). It is also known that the same ASSVd isolate may cause two different diseases (apple scar skin and dapple apple), depending on the inoculated cultivar (Desvignes et al., 1999), but whether specific viroid variants are actually selected in the infected hosts showing a specific disease is not known. Similarly, different sequence variants of AFCVd have been isolated from three different natural hosts (apple, hop and pomegranate), but whether they have different biological features remains unexplored.

All the above mentioned uncertainties are even more pronounced for viruses recently discovered by high-throughput sequencing (HTS), for which data on genomic diversity and biological features are almost completely lacking.

3.1.4. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, the viruses of *Cydonia*, *Malus* and *Pyrus* categorised in the present opinion can be detected by molecular methods. Moreover, serological and biological methods are also available for some of them.

For all the categorised viruses, molecular and/or serological detection methods are available. However, in the absence or near absence of information on the genetic variability of these agents, it is not possible to guarantee the specificity of the available detection methods and whether they can detect the majority of the strains of that particular virus. This is particularly true in the case of detection methods based on polymerase chain reaction (PCR) because one or a few mutations in the binding sites of primers may be sufficient to abolish amplification of a particular variant. For some of the categorised viruses, biological methods based on bioassays are also available. It must be also stressed that diagnostics in woody host plants is sometimes difficult because of the uneven virus distribution, low virus titres or presence of inhibitors in the extracts to be tested. In Table 5, the information on the availability of detection and identification methods for each categorised virus is summarised together with the associated uncertainty.

Table 5: Available detection and identification methods of the categorised viruses with the associated uncertainty

VIRUS/VIROID name	Are detection and identification methods available for the pest?	Justification (key references)	Reasoning and/or source of uncertainty
Apple fruit crinkle viroid (AFCVd)	Yes	Di Serio et al. (2017b)	No uncertainty
Apple scar skin viroid (ASSVd)	Yes	Hadidi et al. (2017)	No uncertainty
Apple hammerhead viroid (AHVd)	Yes	Messmer et al. (2017); Serra et al. (2018)	Uncertainty (absence of a proven protocol) ^(a)
Apple geminivirus (AGV)	Yes	Liang et al. (2015)	Uncertainty (absence of a proven protocol) ^(a)
Apple green crinkle-associated virus (AGCaV)	Yes	James et al. (2013)	Uncertainty (known impact of high sequence variability of AGCaV on detectability by PCR (James et al., 2013) ^(a))
Apple latent spherical virus (ALSV)	Yes	Koganezawa and Ito (2011); Kishigami et al. (2014)	Uncertainty (absence of a proven protocol) ^(b)
Apple necrotic mosaic virus (ApNMV)	Yes	Noda et al. (2017); sequence available on NCBI	Uncertainty (absence of a proven protocol) ^(a)
Apple-associated luteovirus (AaLV)	Yes	Shen et al. (2018); sequence available on NCBI	Uncertainty (absence of a proven protocol) ^(a)
Blackberry chlorotic ringspot virus (BCRV)	Yes	Ho and Tzanetakis (2012); Martin et al. (2013)	No uncertainty
Cherry rasp leaf virus (CRLV)	Yes	Osman et al. (2017)	No uncertainty
Eggplant mottled crinkle virus (EMCV)	Yes	Russo et al. (2002); sequence available on NCBI	Uncertainty (absence of a proven protocol for testing woody host plants)
Pyrus pyrifolia cryptic virus (PpCV)	Yes	Osaki et al. (2017); sequence available on NCBI	Uncertainty (absence of a proven protocol) ^(a)
Pyrus pyrifolia partitivirus 2 (PpPV-2)	Yes	Osaki and Sasaki (2018); sequence available on NCBI	Uncertainty (absence of a proven protocol) ^(a)
Temperate fruit decay-associated virus (TFDaV)	Yes	Basso et al. (2015); sequence available on NCBI	Uncertainty (absence of a proven protocol) ^(a)
Tobacco ringspot virus (TRSV)	Yes	EPPO Diagnostic protocol PM 7/2; (Rowhani et al., 2017)	No uncertainty
Tomato ringspot virus (ToRSV)	Yes	EPPO Diagnostic protocol PM 7/49; (Rowhani et al., 2017)	No uncertainty
Tulare apple mosaic virus (TAMV)	Yes	Sequence available on NCBI	Uncertainty (absence of a proven protocol) ^(b)

(a): For this recently described agent, a detection assay has been developed by the discovering laboratory. However, there is very limited information as to whether this assay allows the detection of a wide range of isolates of the agent.

(b): Only one or very few isolates have ever been studied. The polyvalence of the reported assays is unknown.

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

The viruses of *Cydonia*, *Malus* and *Pyrus* categorised here have been reported mainly in Asia and North America. Their distribution outside the EU is reported in Table 6, which was prepared using data from the EPPO and/or CABI databases (Accessed from 7 September 2018 to 14 December 2018), and, when not available in these sources, from extensive literature searches. For some viruses, data from EPPO and CABI are not consistent; these cases have been highlighted by superscript numbers in Table 6. Available distribution maps are provided in Appendix A.

Table 6: Distribution outside the EU of the categorised viruses of *Cydonia*, *Malus* and *Pyrus*

VIRUS/VIROID name	Distribution according to EPPO gd and/or CABI cpc	Additional information (refs)
Apple fruit crinkle viroid (AFCVd)	na ^(a)	ASIA: Japan (Di Serio et al., 2017b)
Apple scar skin viroid (ASSVd)	ASIA: China ^(b) , India ^(b) , Iran ^(b) , Japan ^(b) , Republic of Korea ^(b) , Turkey ^(b) AMERICA: Canada ^(b) , USA ^(b) , Argentina ^(b) (Map: Appendix A.1)	
Apple hammerhead viroid (AHVd)	na ^(a)	ASIA: China (Zhang et al., 2014), Japan (Szostek et al., 2018). AMERICA: Canada (Messmer et al., 2017), USA. OCEANIA: New Zealand (Szostek et al., 2018)
Apple geminivirus (AGV)	na ^(a)	ASIA: China (Liang et al., 2015)
Apple green crinkle-associated virus (AGCaV)	na ^(a)	AMERICA: Canada (James et al., 2013). OCEANIA: Australia, New Zealand (James et al., 2013)
Apple latent spherical virus (ALSV)	na ^(a)	ASIA: Japan (Koganezawa and Ito, 2011)
Apple necrotic mosaic virus (ApNMV)	na ^(a)	ASIA: Korea (Cho et al., 2017), Japan, China (Noda et al., 2017)
Apple-associated luteovirus (AaLV)	na ^(a)	ASIA: China (Shen et al., 2018)
Blackberry chlorotic ringspot virus (BCRV)	na ^(a)	ASIA: Republic of Korea (Seo et al., 2017) AMERICA: USA (Martin et al., 2013)
Cherry rasp leaf virus (CRLV)	AMERICA: Canada, USA. ASIA: China ^(c) (Map: Appendix A.2)	
Eggplant mottled crinkle virus (EMCV)	na ^(a)	ASIA: Israel, Lebanon, Iran (Dombrovsky et al., 2009); India (Raj et al., 1989)
Pyrus pyrifolia cryptic virus (PpCV)	na ^(a)	ASIA: Japan (Osaki et al., 2017)
Pyrus pyrifolia partitivirus 2 (PpPV-2)	na ^(a)	ASIA: Japan (Osaki and Sasaki, 2018)
Temperate fruit decay-associated virus (TFDaV)	na ^(a)	AMERICA: Brasil (Basso et al., 2015)
Tobacco ringspot virus (TRSV)	AFRICA: Democratic republic of the Congo, Egypt, Malawi, Morocco, Nigeria, Zambia ^(b) ; AMERICA: Brazil, Canada, Chile, Cuba, Dominican Republic, Mexico, Peru ^(b) , USA, Uruguay, Venezuela; ASIA: China, India, Indonesia, Iran, Japan, DPR Korea ^(b) , Kyrgyzstan, Oman ^(b) , Saudi Arabia, Sri Lanka, Taiwan; EUROPE (non-EU): Georgia, Russia, Serbia (&Montenegro), Turkey, Ukraine; OCEANIA: Australia, New Zealand, Papua New Guinea (Map: Appendix A.3)	

VIRUS/VIROID name	Distribution according to EPPO gd and/or CABI cpc	Additional information (refs)
Tomato ringspot virus (ToRSV)	<p>AFRICA: Egypt, Togo; AMERICA: Argentina, Brazil, Canada, Chile, Colombia, Mexico, Peru, Puerto Rico, USA, Venezuela;</p> <p>ASIA: China, India, Iran, Japan, Jordan, Republic OF Korea, Oman, Pakistan, Taiwan^(c);</p> <p>EUROPE (non-EU): Belarus, Russia, Serbia, Turkey;</p> <p>OCEANIA: Fiji, New Zealand (Map: Appendix A.4)</p>	
Tulare apple mosaic virus (TAMV)	na ^(a)	<p>AMERICA: USA (California - http://www.dpvweb.net/dpv/showdpv.php?dpvno=42). TAMV was only found once in nature, there is no evidence that it exists anymore outside experimental material.</p>

(a): No information available.

(b): Record found in CABI but not in EPPO.

(c): Record found in EPPO but not in CABI.

3.2.2. Pest distribution in the EU

Is the pest present in the EU territory? If present, is the pest widely distributed within the EU?

Yes, for ASSVd, AHVd, AGCaV, BCRV, EMCV, TRSV, ToRSV. However, none of them is reported to be widely present in the EU.

No, for AFCVd, AGV, ALSV, ApNMV, AaLV, CRLV, PpCV, PpPV-2, TFDaV, TAMV, which have not been reported in the EU.

Only some of the viruses of *Cydonia*, *Malus* and *Pyrus* categorised here have been reported in the EU (Table 7), where they can be considered to have a restricted distribution. Given their restricted distribution, the Panel considers that these viruses fulfil the definition of non-EU viruses used in the present categorisation efforts.

In the case of ASSVd, that has been reported to be present in several MSs by CABI (Table 7), the quoted references are out dated (prior than the discovery of ASSVd as the agent of apple scar skin disease) and are doubtful because the viroid actual presence was not ascertained. The report of widespread presence of ASSVd in Greece (Kyriakopoulou et al., 2001) is also doubtful because it is based on detection methods lacking appropriate controls (possible cross-hybridisation of specific cRNA probe with other apscaviroids was not excluded) and the infecting ASSVd variants were not sequenced. However, the presence of ASSVd in Greece has been confirmed by appropriate approaches (Kaponi et al., 2012, 2013). Overall, the Panel considers that ASSVd presence in several EU MSs is doubtful but that it should be considered present in Greece.

In the case of TRSV and ToRSV, the viruses have been sporadically detected in some MSs, but the reports, generally old, have not been followed by extensive spread, thus suggesting that the virus remains restricted. Moreover, identification of these viruses has been followed by eradication efforts therefore TRSV and ToRSV detected in MS are generally under eradication or have been already eradicated (e.g. TRSV in Czech Republic and ToRSV in Italy in 2018, EPPO, 2018a,b; TRSV and ToRSV in the Netherlands, EPPO 2018b). In addition, some reports on presence of these viruses in EU MSs are likely incorrect or have been rectified by further publications (e.g. TRSV in Italy (Sorrentino et al., 2013) and ToRSV in France (EPPO, 2018a,b)). Taking this into account, the presence of TRSV and ToRSV in the EU MSs is considered rare and, in any case, restricted and under official control.

In the case of AGCaV, AHVd, BCRV and EMCV, the reports in the EU refer to findings in one or two MSs, generally in a few plants in restricted areas, and have not been followed by further notifications. Further outbreaks in the EU have never been reported for these viruses.

For the viruses not reported to occur in the EU, uncertainties on their possible presence derives from the lack of specific surveys and/or from their recent discovery. Table 7 reports the currently known EU distribution of the viruses of *Cydonia*, *Malus* and *Pyrus* considered in the present opinion.

Table 7: EU distribution of non-EU viruses or viruses with undetermined standing of *Cydonia*, *Malus* and *Pyrus* (those viruses not reported in the EU are excluded from this table)

VIRUS/VIROID name	EU MSs from which the pest is reported
Apple scar skin viroid (ASSVd)*	Greece (Widespread) ^(a) , UK (Present) ^(a) , Italy (Present) ^(a) , Poland (Present) ^(a) , Denmark (Present) ^(a) , France (Restricted distribution) ^(a)
Apple hammerhead viroid (AHVd)	Italy (Chiumenti et al., 2018, reported in only two plants); (Szostek et al., 2018)
Apple green crinkle-associated virus (AGCaV)	Italy (Morelli et al., 2017), Spain ^(c)
Blackberry chlorotic ringspot virus (BCRV)	UK (Martin et al., 2013)
Eggplant mottled crinkle virus (EMCV)	Italy (Russo et al., 2002)
Tobacco ringspot virus (TRSV)*	Czech Republic (Transient, under eradication) ^{(a),(d)} , Hungary (Present, restricted distribution), Italy (present few occurrences), Poland (Present), Lithuania (Present), United Kingdom (Present, few occurrences), Netherlands (Transient, actionable, under eradication) ^{(b),(e)} , Slovakia (Present) ^(a)
Tomato ringspot virus (ToRSV)*	Croatia (Present, few occurrences), France (Present), Germany (Transient, under eradication), Italy (Transient, under eradication) ^(d) , Lithuania (Present), Netherlands (Transient, actionable, under eradication) ^(e) , Poland (Present), Slovakia (Present, restricted distribution), Slovenia (Restricted distribution) ^(a)

*: See discussion on presence and prevalence in the EU MSs above.

(a): Record found in CABI but not in EPPO.

(b): Record found in EPPO but not in CABI.

(c): Information provided by Member State during commenting phase.

(d): Declared eradicated (EPPO, 2018a,b).

(e): EPPO Reporting Service November 2018 (EPPO, 2018b).

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

Non-EU viruses of *Cydonia*, *Malus* and *Pyrus* are included in the Annex I, Part A of the Council Directive 2000/29 as listed in Table 8.

Table 8: Non-EU viruses of *Cydonia*, *Malus* and *Pyrus* in the Council Directive 2000/29

Annex I, Part A	Harmful organisms whose introduction into, and spread within, all Member States shall be banned
Section I	Harmful organisms not known to occur in any part of the community and relevant for the entire community
(d)	Viruses and virus-like organisms
3.	Tobacco ringspot virus
4.	Tomato ringspot virus
5.	Viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L., such as: (b) Cherry rasp leaf virus (American)
	(n) Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.

3.3.2. Legislation addressing the hosts of non-EU viruses and viroids of *Cydonia*, *Malus* and *Pyrus*

Hosts of the viruses categorised here are regulated in the Directive 2000/29/EC. The legislation addressing the *Cydonia*, *Malus* and *Pyrus* hosts is presented in Table 9. Several non-EU viruses of *Cydonia*, *Malus* and *Pyrus* have a wide host range, with the related legislation reported in Section 3.4.1, Table 10.

Table 9: Regulations applying to *Cydonia*, *Malus* and *Pyrus* hosts and commodities that may involve the viruses categorised in the present opinion in Annexes III, IV and V of Council Directive 2000/29/EC

Annex III, Part A		
Plants, plant products and other objects the introduction of which shall be prohibited in all Member States		
	Description	Country of origin
9.	Plants of <i>Chaenomeles</i> Ldl., <i>Cydonia</i> Mill., <i>Crateagus</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., and <i>Rosa</i> L., intended for planting, other than dormant plants free from leaves, flowers and fruit	Non-European countries
18.	Plants of <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L. and <i>Pyrus</i> L. and their hybrids, and <i>Fragaria</i> L., intended for planting, other than seeds	Without prejudice to the prohibitions applicable to the plants listed in Annex III A (9), where appropriate, non-European countries, other than Mediterranean countries, Australia, New Zealand, Canada, the continental states of the USA
Annex III, Part B		
Plants, plant products and other objects the introduction of which shall be prohibited in certain protected zones		
	Description	Protected zone(s)
1	Without prejudice to the prohibitions applicable to the plants listed in Annex IIIA(9), (9.1), (18), where appropriate, plants and live pollen for pollination of: <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L., other than fruit and seeds, originating in third countries other than Switzerland and other than those recognised as being free from <i>Erwinia amylovora</i> (Burr.) Winsl. et al. in accordance with the procedure laid down in Article 18(2), or in which pest free areas have been established in relation to <i>Erwinia amylovora</i> (Burr.) Winsl. et al. in accordance with the relevant International Standard for Phytosanitary Measures and recognised as such in accordance with the procedure laid down in Article 18(2)	E (except the autonomous communities of Andalucia, Aragón, Castilla la Mancha, Castilla y León, Extremadura, the autonomous community of Madrid, Murcia, Navarra and La Rioja, the province of Guipuzcoa (Basque Country), the Comarcas of Garrigues, Noguera, Pla d'Urgell, Segrià and Urgell in the province of Lleida (Comunidad autonoma de Catalunya), the Comarcas de L'Alt Vinalopó and El Vinalopó Mitjà in the province of Alicante and the municipalities of Alborache and Turís in the province of Valencia (Comunidad Valenciana)), EE, F (Corsica), IRL (except Galway city), I (Abruzzo, Apulia, Basilicata, Calabria, Campania, Emilia-Romagna (the provinces of Parma and Piacenza), Lazio, Liguria, Lombardy (except the provinces of Mantua, Milano, Sondrio and Varese), Marche, Molise, Piedmont (except the communes of Busca, Centallo and Tarantasca in the province of Cuneo), Sardinia, Sicily, Tuscany, Umbria, Valle d'Aosta, Veneto (except the provinces of Rovigo and Venice, the communes of Barbona, Boara Pisani, Castelbaldo, Masi, Piacenza d'Adige, S. Urbano and, Vescovana in the province of Padova and the area situated to the south of highway A4 in the province of Verona)), LV, LT (except the municipalities of Babtai and Kédainiai (region of Kaunas)), P, SI (except the regions Gorenjska, Koroška, Maribor and Notranjska, and the communes of Lendava and Renče-Vogrsko (south from the highway H4)), SK (except the county of Dunajská Streda, Hronovce and Hronské Kl'áčany (Levice County), Dvory nad Žitavou (Nové Zámky County), Málinec (Poltár County), Hrhov (Rožňava County), Veľké Ripňany (Topoľčany County), Kazimír, Luhyňa, Malý Horeš, Svätuš and Zátin (Trebíšov County)), FI, UK (Northern Ireland: excluding the townlands of Ballinran Upper, Carrigenagh Upper, Ballinran, and Carrigenagh in County Down, and the Electoral Area of Dunmurry Cross in Belfast, County Antrim; Isle of Man and Channel Islands).

Annex IV, Part A	Special requirements which must be laid down by all Member States for which the introduction and movement of plants, plant products and other objects into and within all Member States	
Section I	Plants, plant products and other objects originating from outside the community	
7.4	<p>Whether or not listed among the CN codes in Part B of Annex V, wood of <i>Amelanchier</i> Medik., <i>Aronia</i> Medik., <i>Cotoneaster</i> Medik., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyracantha</i> M. Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L., other than in the form of:</p> <ul style="list-style-type: none"> — chips, sawdust and shavings, obtained in whole or part from these plants, — wood packaging material, in the form of packing cases, boxes, crates, drums and similar packings, pallets, box pallets and other load boards, pallet collars, dunnage, whether or not actually in use in the transport of objects of all kinds, except dunnage supporting consignments of wood, which is constructed from wood of the same type and quality as the wood in the consignments and which meets the same Union phytosanitary requirements as the wood in the consignment, but including that which has not kept its natural round surface, originating in Canada and the USA 	<p>Official statement that the wood:</p> <ul style="list-style-type: none"> (a) originates in an area free from <i>Saperda candida</i> Fabricius, established by the national plant protection organisation in the country of origin, in accordance with the relevant International Standards for Phytosanitary Measures, which is mentioned on the certificates referred to in Article 13(1)(ii) under the rubric 'Additional declaration', or (b) has undergone an appropriate heat treatment to achieve a minimum temperature of 56 °C for a minimum duration of 30 continuous minutes throughout the entire profile of the wood, which is to be indicated on the certificates referred to in Article 13(1)(ii), or (c) has undergone an appropriate ionising radiation to achieve a minimum absorbed dose of 1 kGy throughout the wood, to be indicated on the certificates referred to in Article 13(1)(ii).
7.5	<p>Whether or not listed among the CN codes in Part B of Annex V, wood in the form of chips obtained in whole or part from <i>Amelanchier</i> Medik., <i>Aronia</i> Medik., <i>Cotoneaster</i> Medik., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyracantha</i> M. Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L., originating in Canada and the USA</p>	<p>Official statement that the wood:</p> <ul style="list-style-type: none"> (a) originates in an area established by the national plant protection organisation in the country of origin as being free from <i>Saperda candida</i> Fabricius in accordance with the relevant International Standards for Phytosanitary Measures, which is mentioned on the certificates referred to in Article 13(1)(ii) under the rubric 'Additional declaration', or (b) has been processed into pieces of not more than 2,5 cm thickness and width, or (c) has undergone an appropriate heat treatment to achieve a minimum temperature of 56 °C for a minimum duration of 30 minutes throughout the entire profile of the chips, which is to be indicated on the certificates referred to in Article 13(1)(ii).

14.1	Plants intended for planting, other than scions, cuttings, plants in tissue culture, pollen and seeds, of <i>Amelanchier</i> Medik., <i>Aronia</i> Medik., <i>Cotoneaster</i> Medik., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyracantha</i> M. Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L. originating in Canada and the USA	<p>Without prejudice to the provisions applicable to the plants in Annex III(A)(9) and (18), Annex III(B)(1), (2) or Annex IV(A)(I), (17), (19.1), (19.2), (20), (22.1), (22.2), (23.1) and (23.2) where appropriate, official statement that the plants:</p> <p>(a) have been grown throughout their life in an area free from <i>Saperda candida</i> Fabricius, established by the national plant protection organisation in the country of origin, in accordance with relevant International Standards for Phytosanitary Measures, which is mentioned on the certificates referred to in Article 13(1) (ii), under the rubric 'Additional declaration', or</p> <p>(b) have been grown during a period of at least two years prior to export, or in the case of plants which are younger than two years have been grown throughout their life, in a place of production established as free from <i>Saperda candida</i> Fabricius in accordance with relevant International Standards for Phytosanitary Measures:</p> <p>(i) which is registered and supervised by the national plant protection organisation in the country of origin, and</p> <p>(ii) which has been subjected annually to two official inspections for any signs of <i>Saperda candida</i> Fabricius carried out at appropriate times, and</p> <p>(iii) where the plants have been grown in a site:</p> <ul style="list-style-type: none"> — with complete physical protection against the introduction of <i>Saperda candida</i> Fabricius, or — with the application of appropriate preventive treatments and surrounded by a buffer zone with a width of at least 500 m where the absence of <i>Saperda candida</i> Fabricius was confirmed by official surveys carried out annually at appropriate times, <p>and</p> <p>(iv) immediately prior to export the plants have been subjected to a meticulous inspection for the presence of <i>Saperda candida</i> Fabricius, in particular in the stems of the plant, including, where appropriate, destructive sampling.</p>
17.	Plants of <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L., intended for planting, other than seeds	<p>Without prejudice to the provisions applicable to the plants listed in Annex III(A)(9), (9.1), (18), Annex III(B)(1) or Annex IV(A)(I)(15), where appropriate, official statement:</p> <p>(a) that the plants originate in countries recognised as being free from <i>Erwinia amylovora</i> (Burr.) Winsl. et al. in accordance with the procedure laid down in Article 18(2), or</p> <p>(b) that the plants originate in pest free areas which have been established in relation to <i>Erwinia amylovora</i> (Burr.) Winsl. et al. in accordance with the relevant International Standard for Phytosanitary Measures and recognised as such in accordance with the procedure laid down in Article 18(2), or</p> <p>(c) that the plants in the field of production and in its immediate vicinity, which have shown symptoms of <i>Erwinia amylovora</i> (Burr.) Winsl. et al., have been removed.</p>

19.2	<p>Plants of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. intended for planting, other than seeds, originating in countries where the relevant harmful organisms are known to occur on the genera Concerned</p> <p>The relevant harmful organisms are</p> <ul style="list-style-type: none"> — on <i>Malus</i> Mill.: — <i>Phyllosticta solitaria</i> Ell. and Ev.; — on <i>Pyrus</i> L.: — <i>Phyllosticta solitaria</i> Ell. and Ev.; — on all species: <p>non-European viruses and viruslike organisms.</p>	<p>Without prejudice to the provisions applicable to the plants where appropriate listed in Annex III(A)(9) and (18), and Annex IV(A)(I)(15) and (17), official statement that no symptoms of diseases caused by the relevant harmful organisms have been observed on the plants at the place of production since the beginning of the last complete cycle of vegetation.</p>
20.	<p>Plants of <i>Cydonia</i> Mill. And <i>Pyrus</i> L. intended for planting, other than seeds, originating in countries where Pear decline mycoplasma is known to occur</p>	<p>Without prejudice to the provisions applicable to the plants listed in Annex III(A)(9) and (18), and Annex IV(A)(I)(15), (17) and (19.2) official statement that plants at the place of production and in its immediate vicinity, which have shown symptoms giving rise to the suspicion of contamination by Pear decline mycoplasma, have been rogued out at that place within the last three complete cycles of vegetation.</p>
22.1	<p>Plants of <i>Malus</i> Mill. Intended for planting, other than seeds, originating in countries where the relevant harmful organisms are known to occur on <i>Malus</i> Mill.</p> <p>The relevant harmful organisms are:</p> <ul style="list-style-type: none"> — Cherry rasp leaf virus (American), — Tomato ringspot virus, 	<p>Without prejudice to the provisions applicable to the plants, listed in Annex III(A)(9) and (18), Annex III(B)(1) and Annex IV(A)(I)(15), (17) and (19.2), official statement that:</p> <p>(a) the plants have been:</p> <ul style="list-style-type: none"> — either officially certified under a certification scheme requiring them to be derived in direct line from material which has been maintained under appropriate conditions and subjected to official testing for at least the relevant harmful organisms using appropriate indicators or equivalent methods and has been found free, in these thests, from those harmful organisms, or — derived in direct line from material which is maintained under appropriate conditions and subjected, within the last three complete cycles of vegetation, at least once, to official testing for at least the relevant harmful organisms using appropriate indicators or equivalent methods and has been found free, in these tests, from those harmful organisms; <p>(b) no symptoms of diseases caused by the relevant harmful organisms have been observed on plants at the place of production, or on susceptible plants in its immediate vicinity, since the beginning of the last complete cycle of vegetation.</p>

22.2	Plants of <i>Malus</i> Mill., intended for planting, other than seeds, originating in countries where apple proliferation mycoplasma is known to occur	Without prejudice to the provisions applicable to the plants, listed in Annex III(A)(9) and (18), Annex III(B)(1) and Annex IV(A)(I)(15), (17), (19.2) and (22.1), official statement that (a) the plants originate in areas known to be free from apple proliferation mycoplasma; or (b) (aa) the plants, other than those raised from seeds, have been: — either officially certified under a certification scheme requiring them to be derived in direct line from material which has been maintained under appropriate conditions and subjected to official testing for at least Apple proliferation mycoplasma using appropriate indicators or equivalent methods and has been found free, in these tests, from that harmful organism, or — derived in direct line from material which is maintained under appropriate conditions and subjected, within the last six complete cycles of vegetation, at least once, to official testing for at least Apple proliferation mycoplasma using appropriate indicators or equivalent methods and has been found free, in these tests, from the harmful organism, (bb) no symptoms of diseases caused by Apple proliferation mycoplasma have been observed on plants at the place of production, or on susceptible plants in its immediate vicinity, since the beginning of the last complete three cycles of vegetation.
33.	Plants with roots, planted or intended for planting, grown in the open air	Official statement that: (a) the place of production is known to be free from <i>Clavibacter michiganensis</i> ssp. <i>sepedonicus</i> (Spieckermann and Kotthoff) Davis et al. and <i>Synchytrium endobioticum</i> (Schilbersky) Percival, and (b) the plants originate from a field known to be free from <i>Globodera pallida</i> (Stone) Behrens and <i>Globodera rostochiensis</i> (Wollenweber) Behrens.
34.	Soil and growing medium, attached to or associated with plants, consisting in whole or in part of soil or solid organic substances such as parts of plants, humus including peat or bark or consisting in part of any solid inorganic substance, intended to sustain the vitality of the plants, originating in: — Turkey, — Belarus, Georgia, Moldova, Russia, Ukraine, — non-European countries, other than Algeria, Egypt, Israel, Libya, Morocco, Tunisia	Official statement that: (a) the growing medium, at the time of planting, was: — either free from soil, and organic matter, or — found free from insects and harmful nematodes and subjected to appropriate examination or heat treatment or fumigation to ensure that it was free from other harmful organisms, or — subjected to appropriate heat treatment or fumigation to ensure freedom from harmful organisms, and (b) since planting: — either appropriate measures have been taken to ensure that the growing medium has been maintained free from harmful organisms, or — within two weeks prior to dispatch, the plants were shaken free from the medium leaving the minimum amount necessary to sustain vitality during transport, and, if replanted, the growing medium used for that purpose meets the requirements laid down in (a).

36.1	Plants, intended for planting, other than: <ul style="list-style-type: none"> — bulbs, — corms, — rhizomes, — seeds, — tubers, originating in third countries	<p>Without prejudice to the requirements applicable to the plants in Annex IV, Part A, Section I(27.1), (27.2), (28), (29), (31), (32.1) and (32.3), official statement that the plants have been grown in nurseries and:</p> <p>(a) originate in an area, established in the country of export by the national plant protection service in that country, as being free from <i>Thrips palmi</i> Karny in accordance with relevant International Standards for Phytosanitary Measures, and which is mentioned on the certificates referred to in Articles 7 or 8 of this Directive under the rubric 'Additional declaration', or</p> <p>(b) originate in a place of production, established in the country of export by the national plant protection service in that country, as being free from <i>Thrips palmi</i> Karny in accordance with relevant International Standards for Phytosanitary Measures, and which is mentioned on the certificates referred to in Articles 7 or 8 of this Directive under the rubric 'Additional declaration', and declared free from <i>Thrips palmi</i> Karny on official inspections carried out at least monthly during the three months prior to export, or</p> <p>(c) immediately prior to export, have been subjected to an appropriate treatment against <i>Thrips palmi</i> Karny and have been officially inspected and found free from <i>Thrips palmi</i> Karny. Details of the treatment shall be mentioned on the certificates referred to in Article 7 or 8 of this Directive, or</p> <p>(d) originate from plant material (explant) which is free from <i>Thrips palmi</i> Karny; are grown <i>in vitro</i> in a sterile medium under sterile conditions that preclude the possibility of infestation with <i>Thrips palmi</i> Karny; and are shipped in transparent containers under sterile conditions.</p>
39.	Trees and shrubs, intended for planting, other than seeds and plants in tissue culture, originating in third countries other than European and Mediterranean countries	<p>Without prejudice to the provisions applicable to the plants listed in Annex III(a)(1), (2), (3), (9), (13), (15), (16), (17), (18), Annex III(B)(1) and Annex IV(A)(I)(8.1), (8.2), (9), (10), (11.1), (11.2), (12), (13.1), (13.2), (14), (15), (17), (18), (19.1), (19.2), (20), (22.1), (22.2), (23.1), (23.2), (24), (25.5), (25.6), (26), (27.1), (27.2), (28), (29), (32.1), (32.2), (33), (34), (36.1), (36.2), (37), (38.1) and (38.2), where appropriate, official statement that the plants:</p> <ul style="list-style-type: none"> — are clean (i.e. free from plant debris) and free from flowers and fruits, — have been grown in nurseries, — have been inspected at appropriate times and prior to export and found free from symptoms of harmful bacteria, viruses and virus-like organisms, and either found free from signs or symptoms of harmful nematodes, insects, mites and fungi, or have been subjected to appropriate treatment to eliminate such organisms.

46.	<p>Plants intended for planting, other than seeds, bulbs, tubers, corms and rhizomes, originating in countries where the relevant harmful organisms are known to occur.</p> <p>The relevant harmful organisms are:</p> <ul style="list-style-type: none"> — Bean golden mosaic virus, — Cowpea mild mottle virus, — Lettuce infectious yellow virus, — Pepper mild tigré virus, — Squash leaf curl virus, — other viruses transmitted by <i>Bemisia tabaci</i> Genn <p>Where <i>Bemisia tabaci</i> Genn. (non-European populations) or other vectors of the relevant harmful organisms are not known to occur</p> <p>Where <i>Bemisia tabaci</i> Genn. (non-European populations) or other vectors of the relevant harmful organisms are known to occur</p>	<p>Without prejudice to the requirements applicable to the plants listed in Annex III(A)(13) and Annex IV(A)(I)(25.5) (25.6), (32.1), (32.2), (32.3), (35.1), (35.2), (44), (45.1), (45.2) and (45.3) where appropriate</p> <p>Official statement that no symptoms of the relevant harmful organisms have been observed on the plants during their complete cycle of vegetation</p> <p>Official statement that no symptoms of the relevant harmful organisms have been observed on the plants during an adequate period, and</p> <p>(a) the plants originate in areas known to be free from <i>Bemisia tabaci</i> Genn. and other vectors of the relevant harmful organisms; or</p> <p>(b) the place of production has been found free from <i>Bemisia tabaci</i> Genn. and other vectors of the relevant harmful organisms on official inspections carried out at appropriate times; or</p> <p>(c) the plants have been subjected to an appropriate treatment aimed at eradicating <i>Bemisia tabaci</i> Genn; or</p> <p>(d) the plants originate from plant material (explant) which is free from <i>Bemisia tabaci</i> Genn. (non-European populations) and which did not show any symptoms of the relevant harmful organisms; are grown in vitro in a sterile medium under sterile conditions that preclude the possibility of infestation with <i>Bemisia tabaci</i> Genn. (non-European populations); and are shipped in transparent containers under sterile conditions.</p>
Section II Plants, plant products and other objects originating in the Community		
9.	<p>Plants of <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L., intended for planting, other than seeds</p>	<p>Official statement:</p> <p>(a) the plants originate in zones recognised as being free from <i>Erwinia amylovora</i> (Burr.) Winsl. et al. in accordance with the procedure referred to in Article 18(2); or</p> <p>(b) that the plants in the field of production and its immediate vicinity, which have shown symptoms of <i>Erwinia amylovora</i> (Burr.) Winsl. et al., have been rogued out.</p>
13.	<p>Plants of <i>Cydonia</i> Mill., and <i>Pyrus</i> L., intended for planting, other than seeds</p>	<p>Without prejudice to the requirements applicable to plants listed in Annex IV(A)(II)(9), official statement that:</p> <p>(a) the plants originate in areas known to be free from Pear decline mycoplasma;</p> <p>or</p> <p>(b) the plants at the place of production and in its immediate vicinity, which have shown symptoms giving rise to the suspicion of contamination by Pear decline mycoplasma, have been rogued out at that place within the last three complete cycles of vegetation.</p>

15.	Plants of <i>Malus</i> Mill., intended for planting, other than seeds	<p>Without prejudice to the requirements applicable to the plants listed in Annex IV(A)(II)(9), official statement that:</p> <p>(a) the plants originate in areas known to be free from Apple proliferation mycoplasma;</p> <p>or</p> <p>(b) (aa) the plants, other than those raised from seed, have been:</p> <ul style="list-style-type: none"> — either officially certified under a certification scheme requiring them to be derived in direct line from material which has been maintained under appropriate conditions and subjected to official testing for at least Apple proliferation mycoplasma using appropriate indicators or equivalent methods and has been found, in these tests, free from that harmful organism, or — derived in direct line from material which is maintained under appropriate conditions and has been subjected, within the last six complete cycles of vegetation, at least once, to official testing for, at least, Apple proliferation mycoplasma using appropriate indicators or equivalent methods and has been found, in these tests, free from that harmful organism; <p>(bb) no symptoms of diseases caused by Apple proliferation mycoplasma have been observed on the plants at the place of production, or on the susceptible plants in its immediate vicinity, since the beginning of the last three complete cycles of vegetation.</p>
24.	Plants with roots, planted or intended for planting, grown in the open air	There shall be evidence that the place of production is known to be free from <i>Clavibacter michiganensis</i> ssp. <i>sepedonicus</i> (Spieckermann and Kotthoff) Davis et al. and <i>Synchytrium endobioticum</i> (Schilbersky) Percival.

Annex IV, Part B	Special requirements which shall be laid down by all Member States for the introduction and movement of plants, plant products and other objects into and within certain protected zones	
Plant, plant products and other objects	Special requirements	Protected zone(s)
21. Plants and live pollen for pollination of: <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L., other than fruit and seeds	Without prejudice to the prohibitions applicable to the plants listed in Annex IIIA(9), (9.1), (18) and IIIB(1), where appropriate, official statement that: a) the plants originate in third countries recognised as being free from <i>Erwinia amylovora</i> (Burr.) Winsl. et al. in accordance with the procedure laid down in Article 18(2), or b) the plants originate in pest free areas in third countries which have been established in relation to <i>Erwinia amylovora</i> (Burr.) Winsl. et al. in accordance with the relevant International Standard for Phytosanitary Measures and recognised as such in accordance with the procedure laid down in Article 18(2), or c) the plants originate in the Canton of Valais in Switzerland, or d) the plants originate in the protected zones listed in the right-hand column, or e) the plants have been produced, or, if moved into a 'buffer zone', kept and maintained for a period of at least 7 months including the period 1 April to 31 October of the last complete cycle of vegetation, on a field: aa) located at least 1 km inside the border of an officially designated 'buffer zone' of at least 50 km ² where host plants are subject to an officially approved and supervised control regime established at the latest before the beginning of the complete cycle of vegetation preceding the last complete cycle of vegetation, with the object of minimising the risk of <i>Erwinia amylovora</i> (Burr.) Winsl. et al. being spread from the plants grown there. Details of the description of this vegetation, with the object of minimising the risk of <i>Erwinia amylovora</i> (Burr.) →	E (except the autonomous communities of Andalucía, Aragón, Castilla la Mancha, Castilla y León, Extremadura, the autonomous community of Madrid, Murcia, Navarra and La Rioja, the province of Guipuzcoa (Basque Country), the Comarcas of Garrigues, Noguera, Pla d'Urgell, Segrià and Urgell in the province of Lleida (Comunidad autonoma de Catalunya), the Comarcas de L'Alt Vinalopó and El Vinalopó Mitjà in the province of Alicante and the municipalities of Alborache and Turís in the province of Valencia (Comunidad Valenciana)), EE, F (Corsica), IRL (except Galway city), I (Abruzzo, Apulia, Basilicata, Calabria, Campania, Emilia-Romagna (the provinces of Parma and Piacenza), Lazio, Liguria, Lombardy (except the provinces of Mantua, Milano, Sondrio and Varese), Marche, Molise, Piedmont (except the communes of Busca, Centallo and Tarantasca in the province of Cuneo), Sardinia, Sicily, Tuscany, Umbria, Valle d'Aosta, Veneto (except the provinces of Rovigo and Venice, the communes of Barbona, Boara Pisani, Castelbaldo, Masi, Piacenza d'Adige, S. Urbano and, Vescovana in the province of Padova and the area situated to the south of highway A4 in the province of Verona)), LV, LT (except the municipalities of Babtai and Kėdainiai (region of Kaunas)), P, SI (except the regions Gorenjska, Koroška, Maribor and Notranjska, and the communes of Lendava and Renče-Vogrsko (south from the highway H4)), SK (except the county of Dunajská Streda, Hronovce and Hronské Kláačany (Levice County), Dvory nad Žitavou (Nové Zámky County), Málinec (Poltár County), Hrhov (Rožňava County), Vel'ké Ripňany (Topolčany County), Kazimír, Luhyňa, Malý Horeš, Svätuš and Zatín (Třebíšov County)), FI, UK (Northern Ireland: excluding the townlands of Ballinran Upper, Carrigenagh Upper, →

<p>→ Winsl. et al. being spread from the plants grown there. Details of the description of this 'buffer zone' shall be kept available to the Commission and to other Member States. Once the 'buffer zone' is established, official inspections shall be carried out in the zone not comprising the field and its surrounding zone of 500 m width, at least once since the beginning of the last complete cycle of vegetation at the most appropriate time, and all host plants showing symptoms of <i>Erwinia amylovora</i> (Burr.) Winsl. et al. should be removed immediately. The results of these inspections shall be supplied by 1 May each year to the Commission and to other Member States, and</p> <p>bb) which has been officially approved, as well as the 'buffer zone', before the beginning of the complete cycle of vegetation preceding the last complete cycle of vegetation, for the cultivation of plants under the requirements laid down in this point, and</p> <p>cc) which, as well as the surrounding zone of a width of at least 500 m, has been found free from <i>Erwinia amylovora</i> (Burr.) Winsl. et al. since the beginning of the last complete cycle of vegetation, at official inspection carried out at least:</p> <ul style="list-style-type: none"> — twice in the field at the most appropriate time, e.g. once during June to August and once during August to November; and — once in the said surrounding zone at the most appropriate time, e.g. during August to November, and <p>dd) from which plants were officially tested for latent infections in accordance with an appropriate laboratory method on samples officially drawn at the most appropriate period.</p> <p>Between 1 April 2004 and 1 April 2005, these provisions shall not apply to plants moved into and within the protected zones listed in the right-hand column which have been produced and maintained on fields located in officially designated 'buffer zones', according to the relevant requirements applicable before 1 April 2004.</p>	<p>→Ballinran, and Carrigenagh in County Down, and the Electoral Area of Dunmurry Cross in Belfast, County Antrim; Isle of Man and Channel Islands).</p>
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Annex V	Plants, plant products and other objects which must be subject to a plant health inspection (at the place of production if originating in the Community, before being moved within the Community – in the country of origin or the consignor country, if originating outside the Community) before being permitted to enter the Community
Part A	Plants, plant products and other objects originating in the Community
I.	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community and which must be accompanied by a plant passport
1.1	Plants, intended for planting, other than seeds, of <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Prunus</i> L., other than <i>Prunus laurocerasus</i> L. and <i>Prunus lusitanica</i> L., <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L.
II.	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for certain protected zones, and which must be accompanied by a plant passport valid for the appropriate zone when introduced into or moved within that zone
1.3	Plants, other than fruit and seeds, of <i>Amelanchier</i> Med., <i>Castanea</i> Mill., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Eucalyptus</i> L'Herit., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Pyracantha</i> Roem., <i>Pyrus</i> L., <i>Sorbus</i> L. and <i>Vitis</i> L.
1.4	Live pollen for pollination of <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L.
Part B	Plants, plant products and other objects originating in territories, other than those territories referred to in Part A
I.	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community
3.	Fruits of: — <i>Annona</i> L., <i>Cydonia</i> Mill., <i>Diospyros</i> L., <i>Malus</i> Mill., <i>Mangifera</i> L., <i>Passiflora</i> L., <i>Prunus</i> L., <i>Psidium</i> L., <i>Pyrus</i> L., <i>Ribes</i> L. <i>Syzygium</i> Gaertn., and <i>Vaccinium</i> L., originating in non-European countries,
6.	Wood within the meaning of the first subparagraph of Article 2(2), where it: (a) has been obtained in whole or part from one of the order, genera or species as described hereafter, except wood packaging material defined in Annex IV, Part A, Section I, Point 2: [...] — <i>Amelanchier</i> Medik., <i>Aronia</i> Medik., <i>Cotoneaster</i> Medik., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyracantha</i> M. Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L., including wood which has not kept its natural round surface, except sawdust or shavings, originating in Canada or the USA
7.	(a) Soil and growing medium as such, which consists in whole or in part of soil or solid organic substances such as parts of plants, humus including peat or bark, other than that composed entirely of peat. (b) Soil and growing medium, attached to or associated with plants, consisting in whole or in part of material specified in (a) or consisting in part of any solid inorganic substance, intended to sustain the vitality of the plants, originating in: — Turkey, — Belarus, Moldova, Russia, Ukraine, — non-European countries, other than Algeria, Egypt, Israel, Libya, Morocco, Tunisia.
II.	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for certain protected zones
	Without prejudice to the plants, plant products and other objects listed in I.
3.	Live pollen for pollination of <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L.
4.	Parts of plants, other than fruit and seeds, of <i>Amelanchier</i> Med., <i>Chaenomeles</i> Lindl., <i>Cotoneaster</i> Ehrh., <i>Crataegus</i> L., <i>Cydonia</i> Mill., <i>Eriobotrya</i> Lindl., <i>Malus</i> Mill., <i>Mespilus</i> L., <i>Photinia davidiana</i> (Dcne.) Cardot, <i>Pyracantha</i> Roem., <i>Pyrus</i> L. and <i>Sorbus</i> L.

3.3.3. Legislation addressing the organisms that vector the viruses of *Cydonia*, *Malus* and *Pyrus* categorised in the present opinion (Directive 2000/29/EC)

The nematode vectors of CRLV, TRSV and ToRSV are listed in Directive 2000/29/EC:

- *Xiphinema americanum* sensu lato is listed in Annex I, AI, position (a) 26.
- *Xiphinema americanum* sensu lato is also listed in Annex IV, AI:
 - 31. Plants of *Pelargonium* L’Herit. ex Ait., intended for planting, other than seeds, originating in countries where Tomato ringspot virus is known to occur:
 - a) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are not known to occur;
 - b) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are known to occur
- *Xiphinema californicum* is listed in Annex I, AI, position (a) 27.
- *Xiphinema californicum* is also listed in Annex IV, AI:
 - 31. Plants of *Pelargonium* L’Herit ex Ait., intended for planting, other than seeds, originating in countries where Tomato ringspot virus is known to occur:
 - a) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are not known to occur;
 - b) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are known to occur

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

The natural host range of the viruses categorised in the present opinion varies from very restricted to extremely wide. For each one of these viruses, Table 10 integrates data from the previous Scientific Opinion (EFSA PLH Panel, 2019) with additional information on their natural hosts besides *Cydonia*, *Malus* and *Pyrus* spp. However, it must be considered that for all the viruses considered there is uncertainty about the possible existence of additional natural hosts that have not been reported so far. These uncertainties are of course even higher for recently discovered viruses.

Table 10: Natural hosts of the viruses categorised in the present opinion, together with the regulatory status of hosts other than *Cydonia*, *Malus* and *Pyrus* and the associated uncertainties

VIRUS/ VIROID name	<i>Malus</i>	<i>Pyrus</i>	<i>Cydonia</i>	Other hosts (refs)	Regulation addressing other hosts ^(a)	Uncertainties
Apple fruit crinkle viroid (AFCVd)	Yes			<i>Humulus lupulus</i> , <i>Diospyros kaki</i> (Di Serio et al., 2017b)	<i>H. lupulus</i> : IVAI 26; IVAI 19; VAI 1.2. <i>D. kaki</i> : VB 3	Natural hosts belong to different botanical families. Additional natural hosts may exist
Apple scar skin viroid (ASSVd)	Yes	Yes		<i>Prunus armeniaca</i> (Zhao and Niu, 2008) and <i>Prunus persica</i> (a single report from China; Wang et al., 2012); <i>Prunus avium</i> (a single report from Greece; Kaponi et al., 2013); <i>Prunus</i> <i>cerasoides</i> (a single report from India; Walia et al., 2012)	<i>Prunus</i> sp.: IIIA 9,18; IVAI 7.4, 7.5, 14.1, 16.6, 19.2, 23.1, 23.2; IVAI 12, 16; VB 20.5, VAI 1.1, 2.1, VAII 1.2, VBI 1, 2, 3, 6	Experimental hosts in different botanical families. Additional natural hosts may exist

VIRUS/ VIROID name	<i>Malus</i>	<i>Pyrus</i>	<i>Cydonia</i>	Other hosts (refs)	Regulation addressing other hosts ^(a)	Uncertainties
Apple hammerhead viroid (AHVd)	Yes			No other known natural host		Most <i>Avsunviroidae</i> species have host range restricted to a single botanical species or genus, so that existence of additional natural hosts is not considered to have high probability
Apple geminivirus (AGV)	Yes			No other known natural host		Recently described virus (2015) that has been experimentally transmitted to herbaceous hosts (Liang et al., 2015). Additional natural hosts may exist
Apple green crinkle- associated virus (AGCaV)	Yes		Yes	No other known natural host		Recently reported virus (James et al., 2013). Additional natural hosts may exist
Apple latent spherical virus (ALSV)	Yes			No other known natural host		ALSV has been experimentally transmitted to numerous herbaceous hosts in different botanical families (Koganezawa and Ito, 2011). Additional natural hosts may exist
Apple necrotic mosaic virus (ApNMV)	Yes			No other known natural host		Recently described virus (2017). Additional natural hosts may exist
Apple- associated luteovirus (AaLV)	Yes			No other known natural host		Recently described virus (2018). Additional natural hosts may exist
Blackberry chlorotic ringspot virus (BCRV)	Yes			<i>Rubus</i> sp. and <i>Rosa</i> sp. (Martin et al., 2013)	<i>Rubus</i> sp.: IVAI 19.2, 24; IVAII 12; VA 2.1; VBI 1. <i>Rosa</i> sp.: IIIA 9, IVAI 44, 45.2; VBI 2	Additional natural hosts may exist
Cherry rasp leaf virus (CRLV)	Yes			Wide natural host range EPPO gd: MAJOR: <i>Prunus persica</i> MINOR: <i>Malus</i> , <i>Malus</i> <i>domestica</i> , <i>Prunus</i> <i>domestica</i> , <i>Sambucus</i> <i>nigra</i> INCIDENTAL: <i>Prunus</i> <i>avium</i> , <i>Prunus</i> <i>mahaleb</i> , <i>Rubus idaeus</i>	<i>Rubus</i> sp.: IVAI 19.2, 24; IVAII 12; VA 2.1; VBI 1. <i>Prunus</i> sp.: IIIA 9,18; IVAI 7.4, 7.5, 14.1, 16.6, 19.2, 23.1, 23.2; IVAII 12, 16; VB 20.5, VAI 1.1, 2.1, VAII 1.2, VBI 1, 2, 3, 6	This virus has a large natural host range; it is unlikely that all natural hosts have been identified

VIRUS/ VIROID name	<i>Malus</i>	<i>Pyrus</i>	<i>Cydonia</i>	Other hosts (refs)	Regulation addressing other hosts ^(a)	Uncertainties
				WILD/WEED: <i>Malva</i> , <i>Plantago lanceolata</i> , <i>Taraxacum</i> . CABI cpc: <i>Balsamorhiza sagittata</i> , <i>Malus sylvestris</i> , <i>Prunus cerasus</i> , <i>Plantago major</i> . Detected in potato (James, 2011)		
Eggplant mottled crinkle virus (EMCV)		Yes		<i>Solanum melongena</i> , <i>Pelargonium hortorum</i> (Rasoulpour and Izadpanah, 2008) <i>Solanum capsicastrum</i> (Raj et al., 1988)	<i>S. melongena</i> : IVAI 25.7,25.7.1,25.7.2, 36.2; IVAII 18.6.1,18.7; VB 3; <i>Pelargonium</i> sp.: IVAI 27.1, 27.2, 31; IVAII 20, VAI 2.1; VBI 2	The virus has been reported in natural hosts belonging to different botanical families. Additional natural hosts may exist
Pyrus pyrifolia cryptic virus (PpCV)		Yes		No other known natural host		Unclear whether this is a plant virus
Pyrus pyrifolia partitivirus 2 (PpPV-2)		Yes		No other known natural host		Unclear whether this is a plant virus
Temperate fruit decay- associated virus (TFDaV)	Yes	Yes		<i>Vitis vinifera</i> (Basso et al., 2015)	<i>V. vinifera</i> : IIIA 15, IVAII 17, IVB 21.1,21.2,32; VAI 1.4, VAII 1.3, 1.9, 6A	The virus has been reported in natural hosts belonging to different botanical families. Additional natural hosts may exist
Tobacco ringspot virus (TRSV)	Yes			EPPO gd: MAJOR: <i>Glycine max</i> , <i>Nicotiana tabacum</i> MINOR: <i>Cucurbita pepo</i> , <i>Cucurbitaceae</i> , <i>Vaccinium</i> , <i>Vaccinium corymbosum</i> , woody plants INCIDENTAL: <i>Anemone</i> , <i>Capsicum</i> , <i>Carica papaya</i> , <i>Cornus</i> , <i>Fraxinus</i> , <i>Gladiolus</i> , <i>Iris</i> , <i>Lupinus</i> , <i>Malus domestica</i> , <i>Mentha</i> ; <i>Narcissus</i> <i>pseudonarcissus</i> , <i>Pelargonium</i> , <i>Petunia</i> , <i>Phlox subulata</i> , <i>Prunus avium</i> , <i>Pueraria montana</i> , <i>Rubus fruticosus</i> , <i>Sambucus</i> , <i>Solanum melongena</i> , <i>Sophora microphylla</i> , <i>Vitis vinifera</i> .	<i>Capsicum</i> sp.: IVAI 16.6, 25.7, 36.3, IVAII 18.6.1, 18.7; VB 1,3; <i>Fraxinus</i> sp.: IVAI 2.3,2.4,2.5,11.4; VB 2,5,6; <i>Gladiolus</i> sp.: IVAII 24.1, VA 3; <i>Lupinus</i> sp.: VA 2.1 <i>Narcissus</i> sp.: IVAI 30, IVAII 22, 24.1; VA 3 <i>Vaccinium</i> sp.: VB 3 <i>Iris</i> sp.: IVAII 24.1, VA 3; <i>Pelargonium</i> sp.: IVAI 27.1, 27.2, 31; IVAII 20, VAI 2.1; VBI 2; <i>Prunus</i> sp.: IIIA 9,18; IVAI 7.4, 7.5, 14.1, 16.6, 19.2, 23.1, 23.2; IVAII 12, 16; VB 20.5, VAI 1.1, 2.1, VAII 1.2, VBI 1, 2, 3, 6; <i>Rubus</i> sp.: IVAI 19.2, 24; IVAII 12; VA 2.1; VBI 1;	This virus has a large natural host range; it is unlikely that all natural hosts have been identified

VIRUS/ VIROID name	<i>Malus</i>	<i>Pyrus</i>	<i>Cydonia</i>	Other hosts (refs)	Regulation addressing other hosts ^(a)	Uncertainties
					<i>S. melongena</i> : IVAI 25.7,25.7.1,25.7.2, 36.2; IVAII 18.6.1,18.7; VB 3; <i>V. vinifera</i> : IIIA 15, IVAII 17, IVB 21.1,21.2,32; VAI 1.4, VAII 1.3, 1.9, 6A	
Tomato ringspot virus (ToRSV)	Yes		Yes	EPPO gd: MAJOR: <i>Pelargonium x hortorum</i> , <i>Prunus persica</i> , <i>Rubus idaeus</i> MINOR: <i>Fragaria x ananassa</i> , <i>Gladiolus</i> , <i>Hydrangea macrophylla</i> , <i>Pelargonium</i> , <i>Prunus</i> , <i>Prunus avium</i> , <i>Prunus domestica</i> , <i>Prunus dulcis</i> , <i>Punica granatum</i> , <i>Ribes nigrum</i> , <i>Ribes uva-crispa</i> , <i>Rosa</i> , <i>Rubus</i> , <i>Rubus fruticosus</i> , <i>Vaccinium corymbosum</i> , <i>Vitis vinifera</i> , woody plants INCIDENTAL: <i>Fraxinus americana</i> , <i>Malus</i> , <i>Rubus laciniatus</i> , <i>Solanum lycopersicum</i> , <i>Solanum tuberosum</i> WILD/WEED: <i>Stellaria media</i> , <i>Taraxacum officinale</i>	<i>Pelargonium</i> sp.: IVAI 27.1, 27.2, 31; IVAII 20, VAI 2.1; VBI 2; <i>Prunus</i> sp.: IIIA 9,18; IVAI 7.4, 7.5, 14.1, 16.6, 19.2, 23.1, 23.2; IVAII 12, 16; VB 20.5, VAI 1.1, 2.1, VAII 1.2, VBI 1, 2, 3, 6; <i>Rubus</i> sp.: IVAI 19.2, 24; IVAII 12; VA 2.1; VBI 1; <i>Fraxinus</i> sp.: IVAI 2.3,2.4,2.5,11.4; VB 2, 6; <i>Gladiolus</i> sp.: IVAII 24.1, VA 3; <i>Vaccinium</i> sp.: VB 3 <i>Fragaria</i> sp.: IIIA 18; IVAI 19.2, 21.1,21.2, 21.3; IVAII 12, 14,24.1; IVB 2.1; <i>Narcissus</i> sp.: IIBII 4; IVAI 30; IVAII 22, 24.1; IVB 3; <i>Punica</i> sp.: IVAI 16.6; IVB 3; VA3 <i>Ribes</i> sp.: IVAI 19.2; VB 3; <i>Rosa</i> sp.: IIIA 9, IVAI 44, 45.2; VBI 2. <i>Solanum</i> sp.: IIIA 10,11,12; IVAI 25.1,25.2,25.3, 25.4,25.4.1,25.4.2, 25.5,25.6,25.7, 25.7.1, 25.7.2, 28.1, 36.2, 45.3, 48,; IVAII 18.1,18.1.1, 18.2,18.3,18.3.1, 18.4,18.5, 18.6, 18.6.1, 18.7,26.1,27; IVBI 20.1, 20.2; VAI 1.3, 2.4; VAII 1.5; VB 1,3,4	This virus has a large natural host range; it is unlikely that all natural hosts have been identified

VIRUS/ VIROID name	<i>Malus</i>	<i>Pyrus</i>	<i>Cydonia</i>	Other hosts (refs)	Regulation addressing other hosts ^(a)	Uncertainties
Tulare apple mosaic virus (TAMV)	Yes			Reports of presence in <i>Corylus avellana</i> (Ragozzino, 2011) correspond to old publications that have not been confirmed in recent years and most likely represent misidentification of Apple mosaic virus	<i>Corylus</i> sp.: IVAI 11.3	Uncertainty on whether <i>Corylus avellana</i> may represent a natural host

(a): Numbers reported in this column refer to articles from Council Directive 2000/29/EC.

Eight non-EU viruses of *Cydonia*, *Malus* and *Pyrus* (AHVd, AGV, AGCaV, ALSV, ApNMV, AaLV, PpCV, PpPV-2) have not been reported to have additional natural hosts, although some of them are known to be able to infect some or many experimental herbaceous hosts (ALSV, AGV). The two viroids AFCVd and ASSVd and the viruses BCRV and EMCV naturally infect some additional hosts (*Humulus lupulus* and *Diospyros kaki* in the case of AFCVd; several *Prunus* spp. in the case of ASSVd; *Rubus* spp. and *Rosa* spp. in the case of BCRV; *Solanum melongena*, *Pelargonium hortorum* and *Solanum capsicastrum* in the case of EMCV). In contrast, a wide natural host range has been reported for CRLV, TRSV, ToRSV.

The legislation detailed in Sections 3.3.2 and 3.4.1 regulates the main hosts (*Cydonia*, *Malus* and *Pyrus*) and several other natural hosts (e.g. *Humulus lupulus*, *Diospyros kaki*, *Prunus* spp., *Rubus* spp., *Solanum melongena*, *Pelargonium* spp., *Vitis* spp., *Capsicum* spp., *Fraxinus* spp., *Gladiolus* spp., *Lupinus* spp., *Narcissus* spp., *Vaccinium* spp., *Iris* spp., *Fragaria* spp., *Narcissus* spp., *Punica* spp., *Ribes* spp., *Rosa* spp., *Solanum* spp., *Corylus* spp., *Petunia* spp.) of the viruses categorised here. However, especially for those viruses with a wide host range (e.g. CRLV, TRSV, ToRSV), there are hosts (e.g. *Sambucus nigra*, *Malva*, *Plantago* spp. (*lanceolata* and *major*), *Taraxacum* spp., *Balsamorhiza sagittata*, *Glycine max*, *Cucurbitaceae* (*Cucurbita pepo*), *Anemone* spp., *Carica papaya*, *Cornus* spp., *Mentha* spp., *Phlox subulata*, *Pueraria montana*, *Sambucus* spp., *Sophora microphylla*, *Hydrangea macrophylla*, *Stellaria media*) that are included in the current legislation as plants for planting, other than seeds, but without any specific requirements (Table 10). As a consequence, for several agents regulation of natural hosts does not completely close their potential entry pathways in the EU (see Section 3.4.2 below).

3.4.2. Entry

Is the pest able to enter into the EU territory? (Yes or No) If yes, identify and list the pathways!

Yes, for the viruses of *Cydonia*, *Malus* and *Pyrus* categorised here with the exception of TAMV. These agents may enter EU territory with infected plants for planting. Some of them have additional pathways including plants for planting of other natural hosts, seeds, pollen and/or vectors.

No, for TAMV. As it is not known to currently exist in nature

All the viruses of *Cydonia*, *Malus* and *Pyrus* categorised here can be transmitted by vegetative propagation material. Therefore, plants for planting of *Cydonia*, *Malus* and *Pyrus* must be considered as being potentially the most important entry pathway. Moreover, some of these viruses have additional natural hosts that also are vegetatively propagated (e.g. *Humulus lupulus*, *Diospyros kaki*, *Prunus* spp., *Pelargonium* spp., *Rubus* spp., *Rosa* spp.), thus providing additional entry pathways.

Some viruses of *Cydonia*, *Malus* and *Pyrus* categorised here can also be transmitted by seeds, and/or pollen, and/or vectors (Table 4) that may also provide entry pathways. Information on seed, pollen and vector transmission are limited for some of the categorised viruses, especially for those recently discovered. Uncertainties on the transmission mechanisms for these viruses generate uncertainties also on the possible pathways to be considered. Major entry pathways for the viruses here categorised are summarised in Table 11.

Current legislation prohibits entry in the EU of plants for planting (the definition of which includes pollen) of *Cydonia*, *Malus*, *Prunus*, *Pyrus*, and *Rosa*, from non-EU countries (Annex IIIA 9 and 18), but introduction of dormant plants (free from leaves, flowers and fruit) of *Cydonia*, *Malus*, *Prunus* and *Pyrus* and their hybrids is permitted from Mediterranean countries, Australia, New Zealand, Canada and the continental states of the USA (Annex IIIA 18). This means that the entry pathways regarding plants for planting are only partially regulated for those viruses present in the above mentioned countries. However, restrictions applying to plants for planting – in general (e.g. Annex IVA 33, 36.1, 39, 46) or specifically referring to *Cydonia*, *Malus* and *Pyrus* (e.g. annex IVA 14.1 and 17) in relation to other harmful organisms may contribute to restrict the areas from which plants for planting of *Cydonia*, *Malus* and *Pyrus* can be imported as dormant plants or the areas where such material can be planted.

Although not specifically stated in the regulation, pollen for pollination is considered as dormant plants for planting (EFSA PLH Panel, 2013), thus import of pollen for pollination from Mediterranean countries, Australia, New Zealand, Canada and the continental states of the USA, without prejudice to other provisions, is also permitted, with the exception of *E. amylovora* Protected Zones (EFSA PLH Panel, 2013). However, as already stated in a previous EFSA opinion (EFSA PLH Panel, 2013): *It should be stressed that the current legislation is complex and difficult to understand and that its interpretation when it comes to the specific case of pollen for pollination purposes is far from obvious.*

Seeds from *Cydonia*, *Malus* and *Pyrus* are currently not regulated and can be imported without any restrictions. Seeds of some of the other hosts of the viruses categorised here are regulated.

Fruits of *Cydonia*, *Malus* and *Pyrus* imported from non-European countries must be accompanied by a phytosanitary certificate. This measure mostly targets the potential import of fruit flies in consignments and its relevance for the viruses categorised here is unclear. This situation is noteworthy for those agents that may be seed-transmitted, although fruit import is unlikely to represent a pathway of major relevance.

Although Annex IV A, at point 19.2, requires '*official statement that no symptoms of diseases caused by the relevant harmful organisms*' (e.g. *non-European viruses and virus-like organisms*) *have been observed on the plants at the place of production since the beginning of last complete cycle of vegetation*, this measure is considered to have limited impact in preventing import of infected plants of *Cydonia*, *Malus* and *Pyrus* intended for planting. This is because symptoms in the infected plants are often not obvious. Similarly, Annex IVA point 22.1, applies to *plants of Malus Mill. intended for planting, other than seeds, originating in countries where the relevant harmful organisms (e.g. CRLV and ToRSV) are known to occur on Malus Mill.* and determines requirements for testing and certification. However, this measure does not apply to *Cydonia* and *Pyrus*, which may host other viruses categorised here. Similar requirements, without prejudice to other provisions (e.g. Annex I and III), are established in Annex IV with respect to plants of *Prunus* and *Rubus* intended for planting (Annex IVA 23.2 and 23.3, respectively) for which certification excluding the presence of some viruses categorised here (CRLV and ToRSV) is requested. Also in this case, the needed certification and testing requirements for plants for planting is limited to only some of the viruses of *Cydonia*, *Malus* and *Pyrus* categorised here, thus closing only partially the related entry pathways. The Panel also notes that this legislation is complex, which may create interpretation problems, and that it does not completely eliminate the risk of introduction on the plant for planting pathway for at least some of the viruses categorised here.

Annex V (BI 1, 2 and BII 3, 4) establishes that plant for plantings, pollen and/or part of plants of several host species (*Cydonia*, *Malus*, *Pyrus*, *Prunus*, *Rosa* and *Rubus*) concerned must be accompanied by a valid phytosanitary certificate in order to be introduced in the EU. Although this measure may impair introduction of viruses explicitly mentioned in Annex I (TRSV, ToRSV, CRLV) it might not be as efficient for the other viruses categorised here, which are not explicitly mentioned, and are only covered by the general and possibly difficult to interpret term of *Non-European viruses and virus-like organisms*.

Annex VA lists all the potential hosts which must be checked and accompanied by a plant passport. This measure may impair the spread of viruses on *Cydonia*, *Malus* and *Pyrus*, and other species that are regulated in the EU (such as *Prunus*), but has no effect on the dissemination of viruses on non-regulated host plants.

Some viruses of *Cydonia*, *Malus* and *Pyrus* categorised here are transmitted by nematodes (CRLV, TRSV, ToRSV). Viruliferous nematodes entering the EU may introduce the associated viruses. The main entry pathways for nematodes are soil and growing media from areas where the nematodes occur. These pathways are closed by current legislation (Annex IIIA 14 of EU Directive 2000/29/EC). According to a previous EFSA pest categorisation of *Xiphinema americanum sensu lato* (EFSA PLH Panel, 2018a), only *Soil and growing media attached to plants (hosts or non-host plants) from areas*

where the nematode occurs is a major entry pathway for nematodes vectoring viruses. This pathway is not closed as plants may be imported with soil or growing media attached to sustain their live. In the same opinion, soil and growing media attached to (agricultural) machinery, tools, packaging materials has been identified as an entry pathway, but it is not considered an important pathway (EFSA PLH Panel, 2018a).

In summary, the current legislation closes the plants for planting (and pollen) entry pathway for some of the viruses categorised here. While for other ones, this pathway is only partially regulated. In addition, for other natural hosts for some of these agents special requirements do not apply, leaving open potential entry pathways. Finally, the import of seeds of *Cydonia*, *Malus* and *Pyrus* or other hosts is generally not regulated and there are also weak points in the legislation addressing nematode vectors.

In the specific case of TAMV, this virus has only been found once and there is no evidence that it exists anymore in nature (AAB description of plant viruses nr. 42, <http://www.dpvweb.net/dpv/showpv.php?dpvno=42>). The Panel therefore concludes that TAMV is highly unlikely to be able to enter in the EU.

Table 11 summarises the major potential entry pathways that have been identified for the categorised viruses and the respective regulatory status.

Table 11: Major potential entry pathways identified for the viruses of *Cydonia*, *Malus* and *Pyrus* under categorisation and the respective regulatory status

Virus name	Plants for planting of <i>Cydonia-Malus-Pyrus</i>	Pollen of <i>Cydonia-Malus-Pyrus</i>	Seeds of <i>Cydonia-Malus-Pyrus</i>	Plants for planting/ seeds/pollen of other hosts	Viruliferous vectors	Uncertainty factors
Apple fruit crinkle viroid (AFCVd)	Pathway closed by existing legislation	Not a pathway: AFCVd is not known to be pollen-transmitted	Not a pathway: AFCVd is not known to be seed-transmitted	Pathway partially regulated (<i>Humulus</i> spp. and <i>Diospyros</i> spp.). In addition other natural hosts may exist	Not a pathway: AFCVd is not known to be vector-transmitted	- Geographic distribution - Possible seed- and vector-transmission - Possible existence of other natural hosts
Apple scar skin viroid (ASSVd)	Pathway partially regulated (viroid present in Canada and the USA) ^(b)	Not a pathway: ASSVd is not known to be pollen-transmitted	Pathway possibly open: conflicting reports on seed-transmission	Pathway partially regulated for <i>Prunus</i> spp. (virus present in Canada and the USA) ^(b) . In addition other natural hosts may exist	Pathway possibly open: unknown vector(s) may exist	- Geographic distribution - Existence and relevance of vectors - Possible seed-transmission - Possible existence of other natural hosts
Apple hammerhead viroid (AHVd)	Pathway partially regulated (virus present in Canada, the USA, New Zealand) ^(b)	Pathway possibly open: pollen-transmission may exist	Pathway possibly open: seed-transmission may exist	Not a pathway: AHVd is not known to have other natural host(s)	Pathway possibly open: unknown vector(s) may exist	- Geographic distribution - Possible pollen-, seed- and vector-transmission

Virus name	Plants for planting of <i>Cydonia-Malus-Pyrus</i>	Pollen of <i>Cydonia-Malus-Pyrus</i>	Seeds of <i>Cydonia-Malus-Pyrus</i>	Plants for planting/ seeds/pollen of other hosts	Viruliferous vectors	Uncertainty factors
Apple geminivirus (AGV)	Pathway closed by existing legislation	Not a pathway: AGV is not known to be pollen-transmitted	Not a pathway: AGV is not known to be seed-transmitted	Not a pathway: AGV is not known to have other natural host(s)	Pathway possibly open: unknown vector(s) may exist	- Geographic distribution - Possible seed- and vector-transmission - Possible existence of other natural hosts
Apple green crinkle-associated virus (AGCaV)	Pathway partially regulated (present in Canada, Australia, New Zealand) ^(b)	Not a pathway: AGCaV is not known to be pollen-transmitted	Not a pathway: AGCaV is not known to be seed-transmitted	Not a pathway: AGCaV is not known to have other natural host(s)	Not a pathway: AGCaV is not known to be vector-transmitted	- Geographic distribution - Possible pollen-, seed- and vector-transmission - Possible existence of other natural hosts
Apple latent spherical virus (ALSV)	Pathway closed by existing legislation	Pathway closed by existing legislation	Pathway open: known to be seed-transmitted	Not a pathway: ALSV is not known to have other natural host(s)	Pathway closed by existing legislation: unknown nematode vector(s) may exist	- Geographic distribution - Possible existence of other natural hosts
Apple necrotic mosaic virus (ApNMV)	Pathway closed by existing legislation	Pathway closed by existing legislation	Pathway possibly open: seed-transmission may exist	Not a pathway: ApNMV is not known to have other natural host(s)	Not a pathway: ApNMV is not known to be vector-transmitted	- Geographic distribution - Possible existence of vector(s) - Possible existence of other natural hosts
Apple-associated luteovirus (AaLV)	Pathway closed by existing legislation	Not a pathway: AaLV is not known to be pollen-transmitted	Not a pathway: AaLV is not known to be seed-transmitted	Not a pathway: AaLV is not known to have other natural host(s)	Pathway possibly open: unknown vector(s) may exist	- Geographic distribution - Possible seed- and vector-transmission - Possible existence of other natural hosts
Blackberry chlorotic ringspot virus (BCRV)	Pathway partially regulated (virus present in the USA) ^(b)	Pathway partially regulated (virus present in the USA) ^(b)	Pathway open: known to be seed-transmitted.	Pathway partially regulated for <i>Rubus</i> and <i>Rosa</i> spp. In addition other natural hosts may exist	Not a pathway: BCRV is not known to be vector-transmitted	- Geographic distribution - Possible existence of vector(s)

Virus name	Plants for planting of <i>Cydonia-Malus-Pyrus</i>	Pollen of <i>Cydonia-Malus-Pyrus</i>	Seeds of <i>Cydonia-Malus-Pyrus</i>	Plants for planting/ seeds/pollen of other hosts	Viruliferous vectors	Uncertainty factors
Cherry rasp leaf virus (CRLV)	Pathway partially regulated (virus present in Canada, the USA) ^(b)	Pathway partially regulated (virus present in Canada, the USA) ^(b)	Pathway possibly open: seed-transmission may exist	Pathway partially regulated: because of the wide range of regulated and unregulated hosts	Pathway partially regulated: viruliferous nematodes can enter with the soil and growing media still attached to plants	<ul style="list-style-type: none"> - Geographic distribution - Possible seed-transmission in woody hosts - Possible pollen-transmission in woody hosts
Eggplant mottled crinkle virus (EMCV)	Pathway partially regulated (virus present in Lebanon) ^(b)	Not a pathway: EMCV is not known to be pollen-transmitted	Pathway possibly open: seed-transmission may exist	Pathway partially regulated for <i>Pelargonium</i> spp. In addition other natural hosts may exist	Pathway possibly open: unknown vector(s) may exist	<ul style="list-style-type: none"> - Geographic distribution - Possible pollen-, seed- and vector-transmission - Possible existence of other natural hosts
Pyrus pyrifolia cryptic virus (PpCV)	Pathway closed by existing legislation	Pathway closed by existing legislation	Pathway possibly open: seed-transmission may exist	Not a pathway: PpCV is not known to have other natural host(s)	Not a pathway: PpCV is not be vector-transmitted	<ul style="list-style-type: none"> - Geographic distribution - Possible seed- and vector-transmission
Pyrus pyrifolia partitivirus 2 (PpPV-2)	Pathway closed by existing legislation	Pathway closed by existing legislation	Pathway possibly open: seed-transmission may exist	Not a pathway: PpPV-2 is not known to have other natural host(s)	Not a pathway: PpPV-2 is not known to be vector-transmitted	<ul style="list-style-type: none"> - Geographic distribution - Possible seed- and vector-transmission
Temperate fruit decay-associated virus (TFDaV)	Pathway closed by existing legislation	Virus biology not known	Virus biology not known	Pathway closed by existing legislation (<i>Vitis</i> sp. plants for planting import banned)	Virus biology not known	<ul style="list-style-type: none"> - Geographic distribution - Possible seed-, pollen- or vector-transmission - Possible existence of other natural hosts
Tobacco ringspot virus (TRSV)	Pathway partially regulated (virus present in Canada, the USA, Australia, New Zealand) ^(b)	Pathway partially regulated (virus present in Canada, the USA, Australia, New Zealand) ^(b)	Pathway possibly open: seed-transmission may exist	Pathway partially regulated: because of the wide range of regulated and unregulated hosts	Pathway partially regulated: viruliferous nematodes can enter with the soil and growing media still attached to plants	<ul style="list-style-type: none"> - Geographic distribution - Possible seed-transmission in woody hosts - Possible pollen-transmission in woody hosts

Virus name	Plants for planting of <i>Cydonia-Malus-Pyrus</i>	Pollen of <i>Cydonia-Malus-Pyrus</i>	Seeds of <i>Cydonia-Malus-Pyrus</i>	Plants for planting/ seeds/pollen of other hosts	Viruliferous vectors	Uncertainty factors
Tomato ringspot virus (ToRSV)	Pathway partially regulated (virus present in Canada, the USA, New Zealand) ^(b)	Pathway partially regulated (virus present in Canada, the USA, New Zealand) ^(b)	Pathway possibly open: seed-transmission may exist	Pathway partially regulated: because of the wide range of regulated and unregulated hosts	Pathway partially regulated: viruliferous nematodes can enter with the soil and growing media still attached to plants	- Geographic distribution - Possible seed-transmission in woody hosts - Possible pollen-transmission in woody hosts
Tulare apple mosaic virus (TAMV)	Pathway closed: virus not known to be present anymore in nature	Pathway closed: virus not known to be present anymore in nature	Pathway closed: virus not known to be present anymore in nature	Not a pathway: TAMV is not known to have other natural host(s)	Pathway closed: virus not known to be present anymore in nature	- Geographic distribution - Possible existence of other natural hosts

(a): Pathway open: only applicable if the pathway exists, open means that there is no regulation or ban that prevents entry via this pathway.

Pathway closed: opposite of 'pathway open': there is a ban that completely prevents entry via the pathway.

Pathway possibly open: the existence of the pathway, which is not closed by current legislation, is not supported by direct evidence regarding the biology of that virus. However, based on comparisons with the biology of closely related viruses (in the same genus or in the same family), the existence of the pathway cannot be excluded.

Not a pathway: there is no evidence supporting the existence of the pathway.

Pathway regulated: regulations exist that limit the probability of entry along the pathway, but there is not a complete ban on imports.

Pathway partially regulated: the legislation does not cover all the possible paths (e.g. regulations exist for some hosts, but not for others; a ban exists for some non-EU MSs but not for all).

(b): Import not banned from the listed country(ies).

There is no data in Eurostat on imports of dormant host plants for planting from Third Countries into the EU territory (Source: Eurostat, search done on 17 September 2018).

Interceptions of non-EU viruses of *Cydonia*, *Malus* and *Pyrus* were searched in Europhyt database on 18 September 2018 (EUROPHYT, 2018). Only 6 and 5 interceptions of TRSV and ToRSV were reported, respectively, mainly from ornamental hosts. They date back to more than 10 years ago (Table 12). No interception was registered in the case of ASSVd, ALSV, BCRV CRLV, EMCV and TAMV. No interception was reported regarding the apple fruit crinkle disease. AFCVd, AHVd, AGV, ApNMV, AaLV, PpCV, PpPV-2 and TFDaV are not listed in Europhyt.

Table 12: Interceptions of TRSV and ToRSV in the EU

VIRUS/VIROID name	Europhyt interception	Year of interception	Origin	Plant species on which it has been intercepted
Tobacco ringspot virus (TRSV)	6	2000	Portugal	<i>Pelargonium</i> sp.
		2001	Israel	<i>Bacopa</i> sp.
		2001	UK	<i>Pelargonium</i> sp.
		2008	Israel	<i>Impatiens</i> sp.
		2008	Israel	<i>Impatiens</i> sp.
		2008	Israel	<i>Impatiens</i> New Guinea hybrids
Tomato ringspot virus (ToRSV)	5	1997	Israel	<i>Pelargonium</i> sp.
		1997	Israel	<i>Pelargonium</i> sp.
		1999	USA	<i>Pelargonium</i> sp.
		1999	France	<i>Pelargonium</i> x <i>hortorum</i>
		2008	Italy	<i>Malus</i> sp.

The analysis of entry pathways is affected by uncertainties coming from a) the transmission biology and host range of the agents and b) the geographical distribution of the agents. Based on the above data and considerations the entry pathways of the viruses here categorised have been considered as follows:

- Entry pathway involving plants for planting of *Cydonia*, *Malus* and *Pyrus*, other than pollen and seeds: this pathway is closed for AFCVd, AGV, ALSV, ApNMV, AaLV, PpCV, PpPV-2, TFDaV and TAMV. It is partially regulated for ASSVd, AHVd, AGCaV, BCRV, CRLV, EMCV, TRSV, and ToRSV, mainly because the viruses are present in Countries from which import of dormant plants for planting is allowed. However, additional declaration for CRLV and ToRSV is explicitly requested by legislation in the phytosanitary certificate accompanying imported plants for planting, thus further reducing the risk of entry;
- Entry pathway involving pollen of *Cydonia*, *Malus* and *Pyrus*: this pathway is partially regulated for BCRV, CRLV, TRSV and ToRSV. It is possibly open, with uncertainty on the biology of the agent, for AHVd. The pathway is closed for AaLV, ApNMV, PpCV and PpPV-2. For the other viruses, this is not considered a pathway, sometimes with uncertainty, because they are not reported to be pollen-transmitted;
- Entry pathway involving seeds of *Cydonia*, *Malus* and *Pyrus*: this pathway is open for ALSV and BCRV. It is possibly open, with uncertainty on the biology of the agent, for ASSVd, AHVd, ApNMV, CRLV, EMCV, PpCV, PpPV-2, TRSV and ToRSV. For AFCVd, AGV, AGCaV and AaLV, this is not considered a pathway, sometimes with uncertainty, because they are not reported to be seed-transmitted;
- Entry pathway involving other hosts. This pathways is considered:
 - partially regulated for AFCVd, ASSVd, BCRV, CRLV, EMCV, TRSV and ToRSV;
 - not to be a pathway for AHVd, AGV, AGCaV, ALSV, ApNMV, AaLV, PpCV and PpPV-2 (because they have a narrow natural host range);
- Entry pathway involving viruliferous vectors: this pathway mainly refers to the nematode-transmitted viruses (CRLV, TRSV, ToRSV) and is considered partially regulated. The pathway is possibly open, with uncertainty linked to the biology of the agent, for AHVd, ASSVd, AGV, AaLV and EMCV.

Given the extreme uncertainties on the biology of TFDaV, it was not possible for the Panel to ascertain whether the entry pathways involving pollen or seeds of *Cydonia*, *Malus* and *Pyrus* and the pathway of viruliferous vectors might be open.

In the case of TAMV the entry pathways are considered closed because it has been found only once many years ago and there is no other evidence of its presence.

3.4.3. Establishment

Is the pest able to become established in the EU territory? (Yes or No)

Yes, natural hosts of the viruses under categorisation are widespread in the EU and climatic conditions are appropriate for their establishment wherever their hosts may grow in the EU

3.4.3.1. EU distribution of main host plants

Cydonia, *Malus* and *Pyrus* widely occur in EU as commercial crops as well as wild plants. Details on the area of pome fruit production in individual EU MSs are provided in Table 13.

Table 13: Pome fruit Area (cultivation/harvested/production) (1000 ha). Date of extraction 17/09/2018. 'na' stands for data not available

EU country/Year	2013	2014	2015	2016	2017
Belgium	na	na	16.21	16.18	16.19
Bulgaria	na	na	5.38	4.55	4.42
Czechia	9.88	9.84	9.09	8.23	8.06
Denmark	na	na	1.73	1.65	1.58

EU country/Year	2013	2014	2015	2016	2017
Germany (until 1990 former territory of the FRG)	33.67	33.67	33.67	33.67	36.21
Estonia	0.90	0.90	0.60	0.51	0.48
Ireland	0.62	0.64	0.64	0.70	0.70
Greece	17.77	17.23	16.81	14.02	13.45
Spain	na	na	57.54	57.29	56.28
France	56.04	55.53	55.03	54.94	55.56
Croatia	na	na	6.65	6.82	na
Italy	na	na	207.94	88.45	88.99
Cyprus	0.72	0.69	0.69	0.61	0.59
Latvia	3.10	2.90	2.70	2.80	3.80
Lithuania	12.99	12.62	11.83	10.78	10.93
Luxembourg	na	na	0.28	0.28	0.29
Hungary	na	36.33	35.87	35.87	35.54
Malta	na	na	0.00	0.00	0.00
Netherlands	na	na	16.83	16.80	16.70
Austria	7.45	7.21	7.06	7.12	7.12
Poland	na	na	189.60	172.25	169.79
Portugal	26.29	26.48	26.94	28.62	28.67
Romania	65.83	61.03	60.06	59.93	60.33
Slovenia	na	na	2.66	2.62	2.56
Slovakia	na	na	na	na	na
Finland	na	na	0.66	0.66	0.68
Sweden	1.40	1.42	1.46	1.66	1.70
United Kingdom	na	18.00	17.00	18.50	18.10

3.4.3.2. Climatic conditions affecting establishment

Except for those affecting the hosts, no eco-climatic constraints for the viruses categorised here exist. Therefore, it is expected that these viruses are able to establish wherever their hosts may live. *Cydonia*, *Malus* and *Pyrus* are largely cultivated in the EU. The Panel therefore considers that climatic conditions will not impair the ability of viruses addressed here to establish in the EU. However, it must be taken into consideration that virus accumulation and distribution within natural hosts, especially in woody plants, are largely dependent on environmental conditions. The same applies to symptom expression and severity that may be affected by climatic conditions (e.g. temperature and light).

3.4.4. Spread

Are the pests able to spread within the EU territory following establishment? (Yes or No) How?

Yes, all of the categorised viruses can spread through the trade of plants for planting. Some of them are also spread by vectors and/or seeds and/or pollen

RNQPs: Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects?

Yes, all the categorised viruses are spread mainly by plants for planting

Long-distance spread of the viruses infecting *Cydonia*, *Malus* and *Pyrus* categorised here is mainly due to human activities (e.g. movement of plant for planting). Some of these viruses have also natural spread mediated by vectors that are mainly involved in short-distance movement of the pests.

3.4.4.1. Vectors and their distribution in the EU (if applicable)

No vectors are known for many of the viruses categorised here (Table 4). For some of them (AFCVd, ASSVd, AGCaV, ApNMV, BCRV, PpCV, PpPV-2, TFDaV TAMV), the existence of vectors is not known and the biology of related agents would suggest an absence of vectors. In the case of AHVd, AGV, ALSV, AaLV, and EMCV, the existence of vector(s) appears possible (see below) but has not been proven (Table 4). Finally, in the case of CRLV, TRSV and ToRSV the existence of nematode vectors is demonstrated (EFSA PLH Panel, 2018a). In the specific case of TFDaV, the absence of any information or of closely related agents on which to base an assessment prevented the Panel to reach any conclusion on the possible existence of vector(s).

Nematode species *X. americanum* sensu stricto and *Xiphinema americanum* sensu lato (i.e. *X. bricolense*, *X. californicum*, *X. inaequale*, *X. tarjanense*) transmitting TRSV, ToRSV and/or CRLV have not been recorded in the EU. One (*X. intermedium*) has been reported in Portugal (Fauna Europea database), but without any reference to a specific publication. *X. rivesi* has been reported in six EU MSs (France, Germany, Italy, Portugal, Slovenia, Spain, Figure 1 (EFSA PLH Panel, 2018a)). Although under experimental condition the ability of EU populations of *X. rivesi* to transmit ToRSV and TRSV has been demonstrated, they have never been associated with the spread of the corresponding viral diseases under field condition in the EU (EFSA PLH Panel, 2018a).

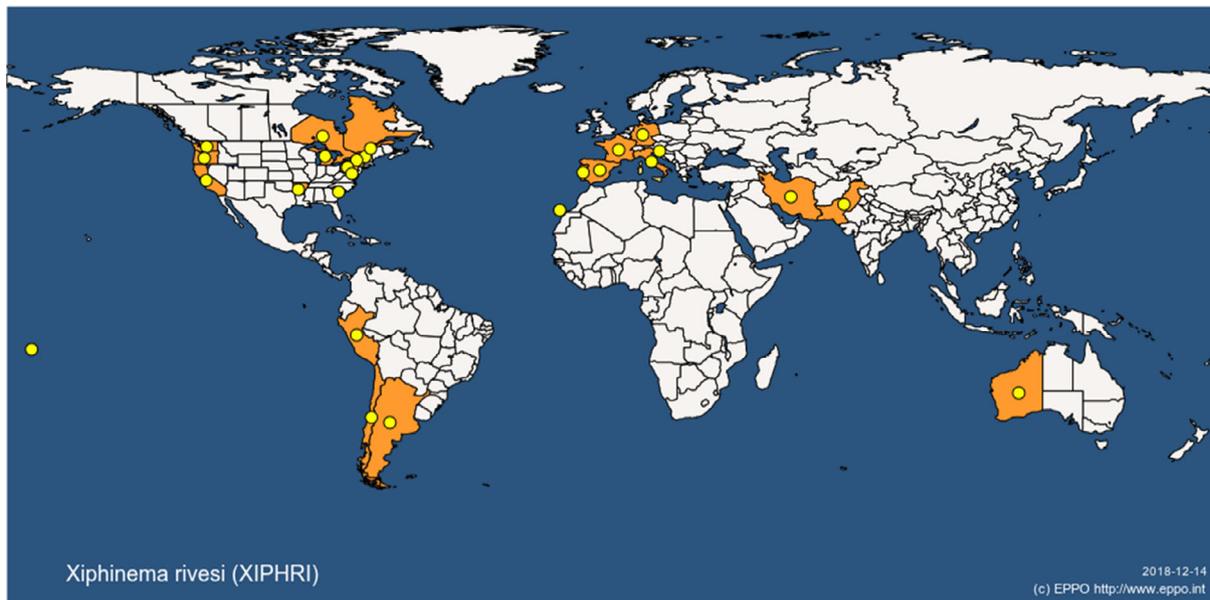


Figure 1: Global distribution map for *Xiphinema rivesi* (extracted from the EPPO Global Database accessed on 14 December 2018)

For several viruses under categorisation there is uncertainty on the possible existence of vectors (Table 4) because vector-mediated (in the case of AHVd, AGV, AaLV, ALSV and EMCV) or vector-assisted (in the case of ApNMV, BCRV and TAMV) transmission has been reported for viruses of the same genus, but direct experimental evidence for the virus under categorisation is lacking. In any case, the identity of these possible vectors, if they exist, is not known, which precludes any analysis on their distribution. Transmission of ASSVd by *Trialeurodes vaporariorum*, which is widespread in the EU, has been reported only between herbaceous hosts in experimental trials (Walia et al., 2015), but whether this whitefly is able to transmit ASSVd to and between woody hosts in nature is unknown.

3.5. Impacts

Would the pests' introduction have an economic or environmental impact on the EU territory?

Yes, for AFCVd, ASSVd, AGCaV, ApNMV, BCRV, CRLV, EMCV, TFDaV, TRSV, ToRSV and TAMV, which may all induce severe disease in economically relevant crops.

No, for AGV, AHVd, ALSV, AaLV, PpCV, PpPV-2, since none of them has so far been associated clearly with symptomatic infection in apple, pear, quince or in other hosts.

RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?⁴

Yes, for AFCVd, ASSVd, AGCaV, ApNMV, BCRV, CRLV, EMCV, TFDaV, TRSV, ToRSV and TAMV. Given the severity of the symptoms they may cause in apple, pear or quince (or eggplant in the case of EMCV), their presence in plants for planting would severely impact their intended use.

No, for AGV, AHVd, ALSV, AaLV, PpCV, PpPV-2. In the absence of a clear link to a symptomatology, it is unclear whether the presence of these agents in plants for planting would impact their intended use, except possibly under some specific situations.

Many viruses categorised here cause symptoms in *Cydonia*, *Malus* and *Pyrus*, thus impacting fruit yield and/or quality. Some of them may also infect and cause severe diseases in other hosts. This situation concerns AFCVd, ASSVd, AGCaV, ApNMV, BCRV, CRLV, TFDaV, TRSV, ToRSV and TAMV (Table 14).

In the particular case of EMCV, no symptoms were reported in pear (Russo et al., 2002), but the virus is associated with symptoms in eggplant (Makkouk et al., 1981; Raj et al., 1988a; Rasoulpour and Izadpanah, 2008). On the other hand, the link between some of the other categorised agents and symptoms is at best tenuous. These are mostly true for recently discovered agents for which very little information is available and which were described from symptomless plants. However, uncertainties may exist on this aspect because for most of these viruses the susceptibility has not been tested on a range of cultivars of each host species nor has the potential for detrimental synergistic interactions with other viral agents been investigated.

Table 14: Expected impact on the EU territory of the categorised viruses

VIRUS/ VIROID name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	<u>RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?</u>
Apple fruit crinkle viroid (AFCVd)	Yes	AFCVd infecting apple causes fruit deformation with dappling and crinkling, the severity of which depend on the apple cultivar. AFCVd may also cause blister bark in some apple cultivars. Relevant losses were registered in Japan, where the disease is endemic, in the 1980s and 1990s. AFCVd caused losses also in hop in Akita prefecture (Japan). The association of AFCVd with symptoms in persimmon is unclear (Ito and Yoshida, 1998; Di Serio et al., 2017b)	Yes

⁴ See section 2.1 on what falls outside EFSA's remit.

VIRUS/ VIROID name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	<u>RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?</u>
Apple scar skin viroid (ASSVd)	Yes	ASSVd, depending on the sequence variant and/or the apple cultivar, is responsible of scar skin and dapple diseases that cause severe losses making the fruits unmarketable. In pear, ASSVd is generally symptomless and this host may be a source of inoculum for susceptible apple trees. However, several pear cultivars infected by ASSVd have been reported to show fruit symptoms of rusty skin, crinkle and dimple fruit disorders. No disease has been proven to be caused by ASSVd in other potential natural hosts (Hadidi et al., 2017). This viroid is considered a major pathogens for apple in China and Japan	Yes
Apple hammerhead viroid (AHVd)	No	No symptom has been observed in inoculated apple seedlings (Serra et al., 2018). Since, AHVd has been reported from both non symptomatic and symptomatic trees (limb flattening, swelling and cracking, delignification, loss of apical dominance, and small and sparse foliage; Zhang et al., 2014; Messmer et al., 2017; Serra et al., 2018), uncertainties exist on the possibility that symptoms may be elicited in some specific cultivars and/or by specific viroid variants (Messmer et al., 2017)	No
Apple geminivirus (AGV)	No	No correlation of AGV with a specific apple disease was found in a the field survey (Liang et al., 2015). The virus has been reported in several apple cultivars, always without an association with symptoms	No
Apple green crinkle- associated virus (AGCaV)	Yes	AGCaV has been associated with diseases in both apple and <i>Cydonia</i> trees. In apple, the fruit of susceptible cultivars show depressed areas, severe fruit malformation, cracking, brownish-red spots, swellings. Severe tree decline is associated with some virus isolates (James et al., 2013). In <i>Cydonia</i> , the virus is associated with symptoms consisting of poorly developed and malformed fruits that fall prematurely, fewer spurs bearing blossoms that appear frequently distorted, leaves smaller and paler than those from non-infected trees. Symptoms were observed in 30-40% of the trees in an infected orchard	Yes
Apple latent spherical virus (ALSV)	No	ALSV does not induce any discernible symptoms in apple trees and in most of its experimental hosts (Koganezawa and Ito, 2011)	No
Apple necrotic mosaic virus (ApNMV)	Yes	ApNMV is closely associated with mosaic symptoms on leaves, supporting the involvement of this virus as the causal agent of a severe disease in apple (Noda et al., 2017)	Yes
Apple- associated luteovirus (AaLV)	No	No correlation of AaLV with a specific apple disease was found in a field survey (Shen et al., 2018). The virus has been reported in several apple cultivars, always without an association with symptoms	No

VIRUS/ VIROID name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	<u>RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?</u>
Blackberry chlorotic ringspot virus (BCRV)	Yes	The association with a disease has not been confirmed for all the isolates and or blackberry varieties. Symptomatic blackberries infected by BCRV from Scotland showed line pattern and ringspot symptoms. However, American isolates did not cause symptoms when graft-transmitted to american germplasm blackberries (Poudel et al., 2011). BCRV pathogenicity may differ depending on the isolates or symptoms may develop only in plant mixed-infected also by another undetermined pathogen(s) (Martin et al., 2013)	Yes
Cherry rasp leaf virus (CRLV)	Yes	In infected apple trees, CRLV may cause severe fruit deformation and reduce the tree vigour and longevity; in peach and cherry it induces symptoms consisting of leaf enations, deformed leaves with depressions, reduction of fruit production and death of spurs and branches associated with stunting and decline in the most susceptible plants. Increased sensitivity to frost and fruit deformation has also reported in cherry (James, 2011). No uncertainty on the impact on the individual plant, however there are uncertainties on the efficiency of vector-mediated spread and overall impact under European condition (James, 2011)	Yes
Eggplant mottled crinkle virus (EMCV)	No (<i>Pyrus</i>)	EMCV is latent in pear (Russo et al., 2002). It causes stunting associated with mottling and malformation of leaves in eggplants (Makkouk et al., 1981); leaf crinkle, stem necrosis and stunting in <i>Solanum capsicastrum</i> (Raj et al., 1988); ring spot and chlorotic spot in geranium (Rasoulpour and Izadpanah, 2008)	No (<i>Pyrus</i>)
	Yes (herbaceous hosts)		Yes (herbaceous hosts)
Pyrus pyrifolia cryptic virus (PpCV)	No	Virus recently described from symptomless plants. No <i>Partitiviridae</i> member has been associated so far with symptoms in plants	No
Pyrus pyrifolia partitivirus 2 (PpPV-2)	No	Virus recently described from symptomless plants. No <i>Partitiviridae</i> member has been associated so far with symptoms in plants	No
Temperate fruit decay- associated virus (TFDaV)	Yes	The virus causes growth reduction of apple and pear when inoculated in these hosts (Basso et al., 2015). There are uncertainties on the efficiency with which the virus would naturally spread under European conditions	Yes

VIRUS/ VIROID name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	<u>RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?</u>
Tobacco ringspot virus (TRSV)	Yes	TRSV causes significant disease in soybeans (<i>Glycine max</i>), tobacco (<i>Nicotiana tabacum</i>), <i>Vaccinium</i> spp., especially <i>V. corymbosum</i> , and <i>Cucurbitaceae</i> . Infected grapevine develops symptoms of decline with shortened internodes, small and distorted leaves (Rowhani et al., 2017) and decreased berry yield (EPPO, 2001). Foliar symptoms (chlorotic spots, rings or areas surrounded by necrotic tissues may be induced in infected stone fruit trees (Martelli and Uyemoto, 2011). No uncertainty on the impact on the individual plant, however there are uncertainties on the efficiency of vector-mediated spread and overall impact under European condition.	Yes
Tomato ringspot virus (ToRSV)	Yes	ToRSV infecting grapevine induces stunted shoot growth, shortened internodes, leaf ringspot and mottling, reduced size of fruit clusters and abortion of many berries (Yang et al., 1986) as well as thickened, spongy phloem tissue with numerous necrotic pits. In <i>Malus</i> , ToRSV causes union necrosis, woody pitting and decline, with tree mortality of 90% and 40% for Red delicious and Spartan varieties, respectively (Sanfaçon and Fuchs, 2011). The virus also causes symptoms in stone fruit trees consisting of stem pitting and decline (in peach and cherry), yellow bud mosaic (in peach and almond), brown line and decline (in plum) (Sanfaçon and Fuchs, 2011). ToRSV is one of the most economically important virus diseases of red raspberry in North America (Stace-Smith and Converse, 1987), with some cultivars showing decline in vigour, stunting and significant fruit yield and quality reduction. Infected <i>Rubus</i> plants often die 4–5 years after infection (Pinkerton et al., 2008). No uncertainty on the impact on the individual plant, however there are uncertainties on the efficiency of vector-mediated spread and overall impact under European condition	Yes
Tulare apple mosaic virus (TAMV)	Yes	Leaf mosaic resembling symptoms induced by apple mosaic virus (http://www.dpvweb.net/dpv/showdpv.php?dpvno=42)	Yes

3.6. Availability and limits of mitigation measures

Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?

Yes, measures are already in place (see Section 3.3) and additional measures could be implemented to further regulate the identified pathways or to limit entry, establishment, spread or impact

RNQPs: Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?

Yes, certification and testing to exclude infection by some viruses here categorised is already requested. Extension of these measures to the viruses not yet covered by certification may help mitigate the risks associated with infection of plants for plantings

3.6.1. Identification of additional measures

Phytosanitary measures are currently applied to *Cydonia*, *Malus* and *Pyrus* (see Section 3.3). Potential additional measures to mitigate the risk of entry of the viruses and viroid categorised here may include:

- extension of phytosanitary measures to specifically include hosts other than *Cydonia*, *Malus* and *Pyrus* for the viruses categorised here,
- banning import of plants for planting (including pollen) from the countries where the viruses categorised here are reported,
- extension of certification schemes and testing requirements to all natural hosts for the viruses categorised here,
- extension of phytosanitary certificate requirements to specifically include hosts other than *Cydonia*, *Malus* and *Pyrus* for the viruses categorised here,
- implementation of regulation for seeds of *Cydonia*, *Malus*, *Pyrus* and other hosts of seed-transmitted viruses categorised here.

Some of the viruses may also enter into the EU through viruliferous nematodes. In agreement with a recent EFSA scientific opinion (EFSA PLH Panel, 2018a) an additional measure could be the regulation of soil and growing media attached to imported plants.

3.6.1.1. Additional control measures

Additional control measures in Table 15 were selected from a longer list of possible control measures reported in EFSA PLH Panel (2018b). Additional control measures are organisational measures or procedures that directly affect pest abundance.

Table 15: Selected additional control measures to consider to reduce the likelihood of pest entry, establishment and/or spread of the categorised viruses

Information sheet title (with hyperlink to information sheet if available)	Control measure summary	Risk component (entry/establishment/spread/impact)	Agent(s)
Growing plants for planting in isolation	Isolation from natural soil in case of viruliferous nematodes or <i>Opidium</i> . Insect proof greenhouses to isolate plants for planting from vectors	Spread	CRLV, EMCV, TRSV, ToRSV (isolation from soil); AGV, ALSV, ApNMV, AaLV, BCRV, TAMV (insect-proof greenhouses)
Roguing and pruning	Removal of infected plants is extremely efficient for all categorised viruses, especially for those not transmitted by vectors. Identification of infected plants in the field may be difficult when exclusively based on visual inspection. Pruning is not effective to remove viruses from infected plants	Establishment and Spread	All viruses categorised here
Post-entry quarantine and other restrictions of movement in the importing country	Identifying virus-infected plants limits the risks of entry, establishment and spread in the EU	Entry, Establishment and Spread	All viruses categorised here

3.6.1.2. Additional supporting measures

Potential supporting measures are listed in Table 16. They were selected from a list of possible control measures reported in EFSA PLH Panel (2018b). Supporting measures are organisational measures or procedures supporting the choice of appropriate risk reduction options that do not directly affect pest abundance.

Table 16: Selected additional supporting measures to consider to reduce the likelihood of pest entry, and/or spread of the categorised viruses

Information sheet title (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/establishment/spread/impact)	Agent(s)
Laboratory testing	Laboratory testing may identify viruses independently of the presence of symptoms in the host, even if for some agents proven or official diagnostic protocols are currently not available	Entry and Spread	All viruses categorised here
Certified and approved premises	Certified and approved premises may guarantee the absence of the harmful viruses from imported <i>Cydonia</i> , <i>Malus</i> , <i>Pyrus</i> plants for planting	Entry and Spread	All viruses categorised here
Delimitation of Buffer zones	A buffer zone may contribute to reduce the spread of non-EU viruses of <i>Cydonia</i> , <i>Malus</i> , <i>Pyrus</i> after entry in the EU	Spread	Only for viruses with efficient spread mechanism besides plants for planting (e.g. CRLV, TRSV and ToRSV)
Phytosanitary certificate and plant passport	These measures may reduce entry and spread of viruses	Entry and Spread	All viruses categorised here
Certification of reproductive material (voluntary/official)	Certification of reproductive material, when not already implemented, would contribute to reduce the risks associated with entry or spread	Entry and Spread	All viruses categorised here
Surveillance	Official surveillance may contribute to early detection of the viruses here categorised favouring immediate adoption of control measures if the agents came to establish	Spread	All viruses categorised here

3.6.1.3. Biological or technical factors limiting the feasibility and effectiveness of measures to prevent the entry, establishment and spread of the pest

- Explicitly list in the legislation the viruses categorised here that are only mentioned under the general term of '*Non-European viruses*';
- Latent infection status for some agents (AHVd, AGV, ALSV, AaLV, PpCV, PpPV-2, EMCV in pear);
- Asymptomatic phase of virus infection renders visual detection unreliable;
- Low concentration and uneven distribution in the woody hosts impairs reliable detection;
- Limited reliability of molecular detection methods;
- Absence of proven detection protocol for newly described agents;
- Wide host range for some agents (CRLV, TRSV, ToRSV);
- Difficulties to control vectors for soil-borne viruses (CRLV, TRSV, ToRSV, possibly also ALSV and EMCV);
- Lack of information on potential vector(s) for some agents;
- Difficulties to control pollen-mediated transmission for some agents (CRLV, TRSV, ToRSV).

3.7. Uncertainty

In the present opinion, viruses for which very different levels of information are available have been analyzed in parallel, including recently described agents for which very limited information is available. The main areas of uncertainty affecting the present categorisation efforts concern:

- biological information on the categorised viruses, especially those described recently based on HTS data, is often very limited;
- distribution, both in the EU and outside the EU, of the viruses categorised here, in particular but not only for the recently described ones;
- volume of imported plants for planting, seeds and pollen of hosts;
- host range of PpCV and PpPV-2 and whether they are plant-associated mycoviruses or true plant viruses;
- interpretation of the legislation;
- pathogenicity of some agents and, for others, the extent to which they would efficiently spread and have impact under conditions prevailing in the EU;
- reliability of available detection methods, which is mainly due to i) the absence of information on the intraspecific variability of several agents (especially those recently reported, e.g. AHVd, AGV, AGCaV, ApNMV, AaLV, EMCV in pear, PpCV, PpPV-2, TFDaV) and ii) the lack of a proven detection protocol.

For each virus, the specific uncertainties identified during the categorisation process are reported in the conclusion tables below.

4. Conclusions

The Panel's conclusions on Pest categorisation of non-EU viruses and viroids of *Cydonia*, *Malus* and *Pyrus* are as follows:

AFCVd, ApNMV, CRLV and TFDaV meet all the criteria evaluated by EFSA to qualify as Union quarantine pests. ASSVd, AGCaV, BCRV, EMCV, TRSV and ToRSV meet all the criteria evaluated by EFSA to qualify as Union quarantine pests with the possible exception of being absent from the EU territory or having a restricted presence and being under official control. AGV, AHVd, ALSV, AaLV, PpCV, PpPV-2 do not meet the criterion of having negative impact in the EU and therefore they do not meet all the criteria evaluated by EFSA to qualify as potential Union quarantine pests. TAMV does not meet the criterion of being able to enter in the EU.

All the viruses categorised in the current opinion do not meet the criteria evaluated by EFSA to qualify as potential RNQPs because they are non-EU viruses explicitly mentioned or considered as regulated in Annex IAI of Directive 2000/29/EC.

The Panel wishes to stress that these conclusions are associated with particularly high uncertainty in the case of viruses discovered only recently and for which the information on distribution, biology and epidemiology are extremely scarce. A consequence of this situation is that for particular agents the results of the categorisation efforts presented here could be very significantly impacted by the development of novel information.

Table 17: The Panel's conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Table 17.1: APPLE FRUIT CRINKLE VIROID (AFCVd)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	AFCVd is well characterised and reliable diagnostic techniques are available	AFCVd is well characterised and reliable diagnostic techniques are available	Taxonomy of AFCVd may evolve because of the closeness with Australian grapevine viroid
Absence/ presence of the pest in the EU territory (Section 3.2)	AFCVd is not known to be present in the EU	AFCVd is not known to be present in the EU. Therefore, AFCVd does not meet this criterion to qualify as a potential Union RNQP	Possible unreported presence in the EU
Regulatory status (Section 3.3)	AFCVd can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AFCVd can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AFCVd not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	AFCVd is able to enter in the EU. However, the <i>Malus</i> plants for planting pathway is closed by existing legislation so that entry is possible through trade of plants for planting of other hosts (hop and persimmon). If AFCVd were to enter the EU territory, it could become established and spread	Plants for planting constitute the main mean of spread for AFCVd	- possible existence of other host species- possible presence in countries from which import of <i>Malus</i> or other host plants for planting is permitted- possible seed and vector transmission- origin and trade volumes of plants for planting of non- <i>Malus</i> host species
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of AFCVd would have a negative impact on the EU pome fruit industry and possibly on the hop one	Because of the negative impact of AFCVd on its hosts, it would have a negative impact on their intended use as plant for planting	- Efficiency of natural spread AFCVd under EU conditions- susceptibility to and impact of AFCVd on some of apple and hop varieties grown in EU
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g., regulation (ban, request for certification) of plants for planting of hosts other than <i>Malus</i> (hop and persimmon))	Certification of planting material for susceptible hosts is, by far, the most efficient control method	Importance of hosts other than <i>Malus</i> for AFCVd entry and spread
Conclusion on pest categorisation (Section 4)	AFCVd meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest	AFCVd is a non-EU viroid (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L. '), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - existence of additional host species; - possible unreported presence in the EU; - regulatory status of AFCVd as it is not explicitly named in Directive 2000/29/EC; - possible presence of AFCVd in countries from which import of plant for planting of its hosts is permitted; - existence and efficiency of possible seed, pollen and vector transmission; - importance of hosts other than <i>Malus</i> for AFCVd dissemination and spread; - efficiency of natural spread and the magnitude of impact under EU conditions 		

Table 17.2: APPLE SCAR SKIN VIROID (ASSVd)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	ASSVd is well characterised and reliable diagnostic techniques are available	ASSVd is well characterised and reliable diagnostic techniques are available	No uncertainty
Absence/ presence of the pest in the EU territory (Section 3.2)	ASSVd is present in Greece but its reported presence in several other EU MSs is doubtful	ASSVd is present in Greece but its reported presence in several other EU MSs is doubtful	Geographical distribution and prevalence in the EU
Regulatory status (Section 3.3)	ASSVd can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	ASSVd can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	ASSVd not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	ASSVd is able to enter in the EU. The main pathway plants for planting of <i>Malus</i> , <i>Pyrus</i> and <i>Prunus</i> spp. is only partially closed by existing legislation. The seed pathway may be possibly open for the same host genera. If ASSVd were to further enter the EU territory, it could become established and spread.	Plants for planting constitute the main mean for ASSVd spread	<ul style="list-style-type: none"> - possible existence of other host species - possible pollen or vector-mediated transmission - importance of hosts other than <i>Malus</i>, <i>Pyrus</i> and <i>Prunus</i> for ASSVd dissemination and spread - efficiency of natural spread of ASSVd under EU conditions - significance of the seed pathway given the uncertainty on ASSVd seed transmission
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of ASSVd would have a negative impact on the EU apple and pear fruit industry	Because of the negative impact of ASSVd on host species, it would have a negative impact on their intended use as plant for planting	<ul style="list-style-type: none"> - magnitude of the impact of ASSVd under EU conditions - susceptibility to and impact of ASSVd on some apple and pear varieties grown in EU

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g., tightening of regulations (ban, request for certification, etc.) of plants for planting to cover imports from all countries where ASSVd is present, regulate seed import for susceptible species)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	ASSVd meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest with the possible exception of the criterion of absence from the EU territory	ASSVd is a non-EU viroid (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - geographical distribution and prevalence in the EU; - regulatory status of ASSVd as it is not explicitly named in Directive 2000/29; - possible additional host species; - possible pollen- or vector-mediated transmission; - importance of hosts other than <i>Malus</i>, <i>Pyrus</i> and <i>Prunus</i> for ASSVd dissemination and spread; - efficiency of natural spread of ASSVd under EU conditions; - significance of the seed pathway 		

Table 17.3: APPLE HAMMERHEAD VIROID (AHVd)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	AHVd is well characterised and reliable diagnostic techniques are available	AHVd is well characterised and reliable diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/ presence of the pest in the EU territory (Section 3.2)	AHVd has been reported in 1 MS and its distribution is considered restricted in the EU	AHVd has been reported in 1 MS and its distribution is considered restricted in the EU	Possible more widespread presence of AHVd in the EU

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Regulatory status (Section 3.3)	AHVd can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AHVd can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AHVd not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	AHVd is able to enter in the EU. The main pathway of plants for planting of <i>Malus</i> is only partially closed. If AHVd were to further enter the EU territory, it could become established and spread.	Plants for planting constitute the main means for spread for AHVd	- possible seed, pollen or vector-mediated transmission - efficiency of natural spread of AHVd under EU conditions
Potential for consequences in the EU territory (Section 3.5)	Potential consequences are likely nil or very limited since no symptoms were observed in inoculated apple seedlings. Therefore AHVd does not meet this criterion to qualify as a Union quarantine pathogen	The presence of AHVd on plants for planting is not expected to impact their intended use. Therefore, AHVd does not meet this criterion to qualify as a Union RNQP	Possible pathogenicity of AHVd in some apple cultivars or under some specific conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening of regulations (ban, request for certification) of plants for planting to cover imports from all countries where AHVd is present)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	AHVd does not meet all the criteria evaluated by EFSA to be regarded as a Union quarantine pest. It is present in one EU MS and is not known to cause economic or environmental damage	AHVd does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'; 2) it is not expected to impact the intended use of <i>Cydonia</i> , <i>Malus</i> and <i>Pyrus</i> plants for planting	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - geographical distribution and prevalence in the EU; - regulatory status of AHVd as it is not explicitly named in Directive 2000/29/; - existence of seed-, pollen- or vector-mediated transmission; - efficiency of natural spread of AHVd under EU conditions; - possible pathogenicity of AHVd in some apple cultivars or under some specific conditions. Given the very limited literature available on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available		

Table 17.4: APPLE GEMINIVIRUS (AGV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	AGV is well characterised and diagnostic techniques are available	AGV is well characterised and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (Section 3.2)	AGV is not known to be present in the EU	AGV is not known to be present in the EU. Therefore, AGV does not meet this criterion to qualify as a potential Union RNQP	Possible unreported presence of AGV in the EU
Regulatory status (Section 3.3)	AGV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AGV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AGV not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	AGV may possibly enter in the EU. The main pathway <i>Malus</i> plants for planting is closed by existing legislation. Other potential pathways (seeds, other hosts) may possibly be open. If AGV were to enter the EU territory, it could become established and could spread.	Plants for planting constitute the main means for spread for AGV	<ul style="list-style-type: none"> - possible existence of additional host species - possible presence of AGV in countries from which import of <i>Malus</i> spp. plants for planting is permitted - possible existence of seed- and vector-mediated transmission - efficiency of natural AGV spread under EU conditions
Potential for consequences in the EU territory (Section 3.5)	Potential consequences are likely nil or very limited since no symptoms are known to be associated with AGV infection. Therefore, AGV does not meet this criterion to qualify as a Union quarantine pathogen	The presence of AGV on plants for planting is not expected to impact their intended use. Therefore, AHVd does not meet this criterion to qualify as a Union RNQP	Pathogenicity of AGV in some apple cultivars or other hosts, under European conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. growing plant in isolation, post entry quarantine)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	AGV does not meet all the criteria evaluated by EFSA to be regarded as a Union quarantine pest. It is not known to cause economic or environmental damage	AGV does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'; 2) it is not expected to impact the intended use of <i>Cydonia</i> , <i>Malus</i> and <i>Pyrus</i> plants for planting	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Aspects of assessment to focus on/ scenarios to address in future if appropriate	<p>The main knowledge gaps or uncertainties identified concern:</p> <ul style="list-style-type: none"> - possible existence of other host species; - regulatory status of AGV as it is not explicitly named in Directive 2000/29; - possible unreported presence in the EU - possible seed-, pollen- or vector-mediated transmission; - efficiency of natural spread of AGV under EU conditions; - pathogenicity of AGV in some apple cultivars or other hosts, under European conditions. <p>Given the very limited information available on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available</p>		

Table 17.5: APPLE GREEN CRINKLE-ASSOCIATED VIRUS (AGCaV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	AGCaV is well characterised and diagnostic techniques are available	AGCaV is well characterised and diagnostic techniques are available	Difficulties in virus detection because of high sequence variability
Absence/ presence of the pest in the EU territory (Section 3.2)	Presence of AGCaV reported in 2 EU MSs, therefore its presence in the EU is considered restricted	Presence of AGCaV reported in 2 EU MSs, with only restricted distribution	More widespread presence of AGCaV in the EU
Regulatory status (Section 3.3)	AGCaV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AGCaV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AGCaV not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	AGCaV is able to enter in the EU. The main pathway plants for planting of <i>Malus</i> and <i>Cydonia</i> is only partially closed by existing legislation. If AGCaV were to further enter the EU territory, it could become established and spread.	Plants for planting constitute the main means for spread for AGCaV	- possible existence of other natural host species
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of AGCaV would have a negative impact on the EU apple and quince fruit industry	Because of the negative impact of AGCaV on host species, it would have a negative impact on their intended use as plant for planting	Susceptibility to and impact of AGCaV apple and quince varieties grown under EU conditions

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening of regulation (ban, certification) of plants for planting to include all countries where AGCaV is present)	Certification of planting material is the most efficient method of control	No uncertainty
Conclusion on pest categorisation (Section 4)	AGCaV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest, with the possible exception of the criterion of absence from the EU territory	AGCaV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - possible existence of other host species; - geographical distribution and prevalence in the EU; - regulatory status of AGCaV as it is not explicitly named in Directive 2000/29; - susceptibility to and impact of AGCaV apple and quince varieties grown under EU conditions. Given the very limited literature available on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available		

Table 17.6: APPLE LATENT SPHERICAL VIRUS (ALSV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	ALSV is well characterised and reliable diagnostic techniques are available	ALSV is well characterised and reliable diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/ presence of the pest in the EU territory (Section 3.2)	ALSV is not known to be present in the EU	ALSV is not known to be present in the EU. Therefore, ALSV does not meet this criterion to qualify as a potential Union RNQP	Possible unreported presence in the EU
Regulatory status (Section 3.3)	ALSV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	ALSV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	ALSV not explicitly named in Directive 2000/29/EC

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	ALSV is able to enter in the EU. The main pathway plants for planting of <i>Malus</i> is closed by existing legislation, while the seed pathway remains open. If ALSV were to enter the EU territory, it could become established and could spread.	Plants for planting constitute the main means of entry and spread of ALSV	<ul style="list-style-type: none"> - possible existence of other host species - possible presence of ALSV in countries from which import of <i>Malus</i>, spp. plants for planting is permitted - possible pollen or vector-mediated transmission - efficiency of natural spread of ALSV under EU conditions - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> spp.
Potential for consequences in the EU territory (Section 3.5)	Potential consequences are very limited or nil since ALSV does not cause symptoms in apple. Therefore, ALSV does not meet this criterion to qualify as a Union quarantine pathogen	The presence of ALSV on plants for planting is not expected to impact the intended use of these plants. Therefore, ALSV does not meet this criterion to qualify as a Union RNQP	Pathogenicity of ALSV in other apple cultivars grown under EU conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. post entry quarantine,)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	ALSV does not meet all the criteria evaluated by EFSA to be regarded as a Union quarantine pest. It is not known to cause economic or environmental damage	ALSV does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'; 2) it is not expected to impact the intended use of <i>Cydonia</i> , <i>Malus</i> and <i>Pyrus</i> plants for planting	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	<p>The main knowledge uncertainties identified concern:</p> <ul style="list-style-type: none"> - possible existence of other host species; - geographic distribution; - regulatory status of ALSV as it is not explicitly named in Directive 2000/29; - possible pollen- or vector-mediated transmission; - efficiency of natural spread of ALSV under EU conditions; - potential impact of ALSV on apple varieties grown under EU conditions; - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> spp. <p>Given the very limited information available on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available</p>		

Table 17.7: APPLE NECROTIC MOSAIC VIRUS (ApNMV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	ApNMV is well characterised and diagnostic techniques are available	ApNMV is well characterised and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/ presence of the pest in the EU territory (Section 3.2)	ApNMV is not known to be present in the EU	ApNMV is not known to be present in the EU. Therefore, ApNMV does not meet this criterion to qualify as a potential Union RNQP	Possible unreported presence in the EU
Regulatory status (Section 3.3)	ApNMV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	ApNMV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	ApNMV not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	ApNMV may possibly enter in the EU. The main pathway <i>Malus</i> plants for planting is closed by existing legislation. Other potential pathways (seeds, other hosts) may possibly be open. If ApNMV were to enter the EU territory, it could become established and could spread	Plants for planting constitute the main means for spread for ApNMV	<ul style="list-style-type: none"> - possible existence of other host species - possible presence in countries from which import of <i>Malus</i> plants for planting is permitted - existence and significance of seed- and pollen-transmission - efficiency of natural spread of ApNMV under EU conditions
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of ApNMV would have a negative impact on the EU apple fruit industry	Because of the negative impact of ApNMV on host species, it would have a negative impact on their intended use as plants for planting	- susceptibility to and impact of ApNMV in some <i>Malus</i> cultivars grown under EU conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. growing plants in isolation, post entry quarantine)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	ApNMV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest	ApNMV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - possible existence of other host species; - regulatory status of ApNMV as it is not explicitly named in Directive 2000/29; - possible presence in countries from which import of <i>Malus</i> spp. plants for planting is permitted; - existence and significance of seed- and pollen-transmission; - efficiency of natural spread of ApNMV under EU conditions; - susceptibility to and impact of ApNMV in some <i>Malus</i> cultivars grown under EU conditions. Given the very limited information available on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available		

Table 17.8: APPLE-ASSOCIATED LUTEOVIRUS (AaLV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	AaLV is well characterised and reliable diagnostic techniques are available	AaLV is well characterised and reliable diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/ presence of the pest in the EU territory (Section 3.2)	AaLV is not known to be present in the EU	AaLV is not known to be present in the EU. Therefore AaLV does not meet this criterion to qualify as Union RNQP	Possible unreported presence of AaLV in the EU
Regulatory status (Section 3.3)	AaLV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AaLV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	AaLV not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	AaLV may possibly enter in the EU. The main pathway <i>Malus</i> plants for planting is closed by existing legislation Other potential pathways (seeds, other hosts) may possibly be open. If AaLV were to enter the EU territory, it could become established and could spread	Plants for planting constitute the main means for spread for AaLV	<ul style="list-style-type: none"> - possible existence of other host species - possible presence of AaLV in countries from which import of <i>Malus</i> spp. plants for planting is permitted - possible vector-mediated transmission - efficiency of natural spread of AaLV under EU conditions
Potential for consequences in the EU territory (Section 3.5)	Potential consequences are likely nil or very limited since no symptoms are known to be associated with AaLV infection in apple. Therefore, AaLV does not meet this criterion to qualify as a Union quarantine pathogen	The presence of AaLV on plants for planting is not expected to impact the intended use of these plants. Therefore, AaLV does not meet this criterion to qualify as a Union RNQP	Possible pathogenicity of AaLV in some apple cultivars, in other hosts, or under some specific conditions

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. growing plants in isolation, post entry quarantine)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	AaLV does not meet all the criteria evaluated by EFSA to be regarded as a Union quarantine pest. It is not known to cause economic or environmental damage	AaLV does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'; 2) it is not expected to impact the intended use of <i>Cydonia</i> , <i>Malus</i> and <i>Pyrus</i> plants for planting	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - possible existence of other host species; - regulatory status of AaLV as it is not explicitly named in Directive 2000/29; - possible presence of AaLV in countries from which import of <i>Malus</i> spp. plants for planting is permitted; - possible vector-mediated transmission; - efficiency of natural spread of AaLV under EU conditions; - pathogenicity of AaLV in some apple cultivars grown in the EU, in other hosts, or under some specific condition in the EU. Given the very limited available on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available		

Table 17.9: BLACKBERRY CHLOROTIC RINGSPOT VIRUS (BCRV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	BCRV is well characterised and diagnostic techniques are available	BCRV is well characterised and diagnostic techniques are available	No uncertainty
Absence/ presence of the pest in the EU territory (Section 3.2)	BCRV has been reported in the UK and therefore is considered as restricted in the EU	BCRV has been reported in the UK	Possible more widespread presence in the EU

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Regulatory status (Section 3.3)	BCRV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	BCRV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	BCRV not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	BCRV is able to enter in the EU. The <i>Malus</i> plants for planting and pollen pathways are only partially closed by legislation, while the seed pathway remains open. Other hosts (<i>Rubus</i> and <i>Rosa</i>) are regulated by measures closing only partially the plants for planting pathways. If BCRV were to further enter the EU territory, it could become established and could spread	Plants for planting constitute the main spread pathway for BCRV	<ul style="list-style-type: none"> - possible existence of other host species - possible presence in countries from which import of <i>Malus</i> spp. plant for planting is permitted - importance of hosts other than <i>Malus</i> for BCRV for dissemination and spread - origin and trade volumes of seeds and plants for planting of host species - efficiency of natural spread of BCRV under EU conditions - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> spp. and other hosts
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of BCRV would have a negative impact on the EU pome fruit industry and possibly on the <i>Rubus</i> and <i>Rosa</i> ones	Because of the negative impact of BCRV on host species, the virus would have a negative impact on their intended use	- susceptibility to and impact of BCRV on <i>Malus</i> , <i>Rubus</i> and <i>Rosa</i> varieties grown in EU
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening regulation (ban, request for certification) of plants for planting to cover imports of all virus hosts from all countries, regulate seed import for susceptible species)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	BCRV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest with the possible exception of the criterion of absence from the EU territory	BCRV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Aspects of assessment to focus on/ scenarios to address in future if appropriate	<p>The main knowledge gaps or uncertainties identified concern:</p> <ul style="list-style-type: none"> - geographical distribution and prevalence in the EU; - regulatory status of BCRV as it is not explicitly named in Directive 2000/29; - existence of other host species; - possible presence in countries from which import of <i>Malus</i> plants for planting is permitted; - possible vector-mediated transmission; - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> spp. and other hosts - efficiency of natural spread of BCRV under EU conditions; - magnitude of the impact of BCRV under EU conditions 		

Table 17.10: CHERRY RASP LEAF VIRUS (CRLV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	CRLV is well characterised and diagnostic techniques are available	CRLV is well characterised and diagnostic techniques are available	No uncertainty
Absence/ presence of the pest in the EU territory (Section 3.2)	CRLV is not known to be present in the EU	CRLV is not known to be present in the EU. Therefore, CRLV does not meet this criterion to qualify as a potential Union RNQP	Possible unreported presence in the EU
Regulatory status (Section 3.3)	CRLV is currently regulated in Annex IAI	CRLV is currently regulated in Annex IAI	No uncertainty
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	CRLV is able to enter in the EU. The <i>Malus</i> plants for planting pathway is essentially closed by specific legislation targeting CRLV. However, entry is possible with plants for planting of other hosts, seeds of herbaceous hosts and viruliferous nematodes. If CRLV were to enter the EU territory, it could become established and could spread.	Plants for planting constitute the main means for long-distance spread of CRLV	<ul style="list-style-type: none"> - possible seed or pollen-mediated transmission in woody hosts - efficiency of natural spread of CRLV under EU conditions - origin and trade volumes of plants for planting of unregulated host species - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> spp. and other hosts
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of CRLV would have a negative impact on the EU pome fruit industry	Because of the negative impact of CRLV on host species, it would have a negative impact on their intended use	The magnitude of the impact of CRLV under EU conditions

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening of regulation (ban, request for certification) of plants for planting to cover imports of all hosts from all countries where CRLV is present, regulate seed import for susceptible species)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	CRLV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest	CRLV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - possible seed- or pollen-mediated transmission mechanisms in woody hosts; - efficiency of natural spread of CRLV under EU conditions; - possible unreported presence in the EU; - magnitude of the impact of CRLV under EU conditions; - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> spp. and other hosts 		

Table 17.11: EGGPLANT MOTTLED CRINKLE VIRUS (EMCV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	EMCV is well characterised and diagnostic techniques are available	EMCV is well characterised and diagnostic techniques are available	Absence of a proven diagnostic protocol for testing woody host plants
Absence/ presence of the pest in the EU territory (Section 3.2)	EMCV has been reported in 1 EU MSs with restricted distribution	EMCV has been reported in 1 EU MSs with restricted distribution	Possible more significant presence the EU
Regulatory status (Section 3.3)	EMCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	EMCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	EMCV not explicitly named in Directive 2000/29/EC

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	EMCV is able to in the EU. The pear and herbaceous host plant for planting pathways are only partially closed. If EMCV were to further enter the EU territory, it could become established and spread.	Plants for planting constitute the main means for spread for EMCV	- possible existence of other host species - possible seed- or vector-mediated transmission
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of EMCV would not have impact on the EU pear industry. However, it may have a negative impact on some herbaceous host crops (<i>Solanum melongena</i> and <i>Pelargonium</i>)	Because of the negative impact of EMCV on some herbaceous host species, its presence on plants for planting of these species would have a negative impact on their intended use	Magnitude of the impact of EMCV under EU conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening of regulation (ban, request for certification) of plants for planting of herbaceous hosts)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	EMCV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest, with the possible exception of the criterion on absence from the EU territory	EMCV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main gaps or uncertainties identified concern: - possible existence of other host species; - regulatory status of EMCV as it is not explicitly named in Directive 2000/29; - possible presence in countries from which import of <i>Pyrus</i> plants for planting is permitted; - possible seed- or vector-mediated transmission; - efficiency of natural spread of EMCV under EU conditions; - magnitude of the impact of EMCV under EU conditions in its various hosts.		

Table 17.12: PYRUS PYRIFOLIA CRYPTIC VIRUS (PpCV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	PpCV is well characterised and reliable diagnostic techniques are available	PpCV is well characterised and reliable diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (Section 3.2)	PpCV is not known to be present in the EU	PpCV is not known to be present in the EU. Therefore, PpCV does not meet this criterion to qualify as a potential Union	Possible unreported presence in the EU
Regulatory status (Section 3.3)	PpCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	PpCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	PpCV not explicitly named in Directive 2000/29/EC. Whether PpCV is a pear virus or a mycovirus associated with a pear colonising fungus remains unclear.
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	PpCV may possibly enter in the EU. The main pathway <i>Pyrus</i> plants for planting is closed by existing legislation, but the seed pathway may possibly be open. If PpCV were to enter the EU territory, it could become established and could spread	Plants for planting constitute the main means for spread for PpCV	<ul style="list-style-type: none"> - possible presence of PpCV in countries from which import of <i>Pyrus</i> spp. plant for planting is permitted - possible seed and vector-mediated transmission - efficiency of natural spread of PpCV under EU conditions
Potential for consequences in the EU territory (Section 3.5)	Potential consequences are likely nil or very limited since no symptoms are known to be associated with PpCV infection. Therefore, it does not meet this criterion to qualify as a Union quarantine pathogen	The presence of PpCV on plants for planting is not expected to impact the intended use of these plants	Possible pathogenicity of PpCV in some pear cultivars grown in the EU or under some specific conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. post entry quarantine, laboratory testing)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	PpCV does not meet all the criteria evaluated by EFSA to be regarded as a Union quarantine pest. It is not known to cause economic or environmental damage	PpCV does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'; 2) it is not expected to impact the intended use of <i>Cydonia</i> , <i>Malus</i> and <i>Pyrus</i> plants for planting	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Aspects of assessment to focus on/ scenarios to address in future if appropriate	<p>The main knowledge gaps or uncertainties identified concern:</p> <ul style="list-style-type: none"> - whether PpCV is a pear virus or a mycovirus associated with a pear colonising fungi; - regulatory status of PpCV as it is not explicitly named in Directive 2000/29/EC; - possible presence of PpCV in countries from which import of <i>Pyrus</i> spp. plants for planting is permitted; - possible seed-, pollen- or vector-mediated transmission; - efficiency of natural spread of PpCV under EU conditions. <p>Given the very limited available information on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available</p>		

Table 17.13: PYRUS PYRIFOLIA PARTITIVIRUS 2 (PpPV-2)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	PpPV-2 is well characterised and reliable diagnostic techniques are available	PpPV-2 is well characterised and reliable diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/ presence of the pest in the EU territory (Section 3.2)	PpPV-2 is not known to be present in the EU	PpPV-2 is not known to be present in the EU. Therefore, PpPV-2 does not meet this criterion to qualify as a potential Union	Possible unreported presence in the EU
Regulatory status (Section 3.3)	PpPV-2 can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	PpPV-2 can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	PpPV-2 not explicitly named in Directive 2000/29/EC. Whether PpPV-2 is a pear virus or a mycovirus associated with a pear colonising fungi remains unclear
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	PpPV-2 may possibly enter in the EU. The main pathway <i>Pyrus</i> plants for planting is closed by existing legislation, but the seed pathway may possibly be open. If PpPV-2 were to enter the EU territory, it could become established and could spread	Plants for planting constitute the main means for spread for PpPV-2	<ul style="list-style-type: none"> - possible presence of PpPV-2 in countries from which import of <i>Pyrus</i> plants for planting is permitted - possible seed, pollen or vector-mediated transmission - Efficiency of natural spread of PpPV-2 under EU conditions
Potential for consequences in the EU territory (Section 3.5)	Potential consequences are likely nil or very limited since no symptoms are known to be associated with PpCV-2 infection. Therefore, it does not meet this criterion to qualify as a Union quarantine pathogen	The presence of PpPV-2 on plants for planting is not expected to impact the intended use of these plants	Possible pathogenicity of PpCV in some pear cultivars grown in the EU or under some specific conditions

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. post entry quarantine, laboratory testing, certification))	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	PpPV-2 does not meet all the criteria evaluated by EFSA to be regarded as a Union quarantine pest. It is not known to cause economic or environmental damage	PpPV-2 does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'; 2) it is not expected to impact the intended use of <i>Cydonia</i> , <i>Malus</i> and <i>Pyrus</i> plants for planting	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main gaps or uncertainties identified concern: <ul style="list-style-type: none"> - whether PpPV-2 is a pear virus or a mycovirus associated with a pear colonising fungi; - regulatory status of PpCV as it is not explicitly named in Directive 2000/29/EC; - possible presence of PpPV-2 in countries from which import of <i>Pyrus</i> host plants for planting is permitted; - possible seed-, pollen- or vector-mediated transmission mechanisms; - efficiency of natural spread of PpPV-2 under EU conditions. Given the very limited available information on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available		

Table 17.14: TEMPERATE FRUIT DECAY-ASSOCIATED VIRUS (TFDaV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	TFDaV is well characterised and diagnostic techniques are available	TFDaV is well characterised and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/ presence of the pest in the EU territory (Section 3.2)	TFDaV is not known to be present in the EU	TFDaV is not known to be present in the EU	Possible unreported presence in the EU
Regulatory status (Section 3.3)	TFDaV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	TFDaV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	TFDaV not explicitly named in Directive 2000/29/EC

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	TFDaV may possibly enter in the EU. The main pathways, plants for planting of <i>Malus</i> , <i>Pyrus</i> and <i>Vitis</i> , are closed by legislation. Given the lack of information on the biology of TFDaV, the Panel is unable to conclude on the existence of alternative pathways possibly open besides illegal import of plant material If it were to enter the EU territory TFDaV could become established and could spread	Plants for planting constitute the main means for spread for TFDaV	Uncertainties on biological aspects on the virus - possible presence in countries from which import of <i>Malus</i> , <i>Pyrus</i> and <i>Vitis</i> plant for planting is permitted
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of TFDaV would have a negative impact on the EU pome fruit industry	Because of the negative impact of TFDaV on host species, it would have a negative impact on their intended use as plant for planting	- magnitude of the impact of TFDaV under EU conditions - susceptibility and impact of TFDaV on quince and on a range of EU grown apple and pear varieties
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. post entry quarantine, laboratory testing)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	TFDaV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest	TFDaV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	Due to the absence of close relatives on which to draw some hypotheses, the main gaps or uncertainties identified concern essentially all aspects of the biology of TFDaV, including: <ul style="list-style-type: none"> - possible seed-, pollen- or vector-mediated transmission mechanisms; - possible existence of other host species; - possible presence in countries from which import of <i>Malus</i>, <i>Pyrus</i> and <i>Vitis</i> plant for planting is permitted; - efficiency of natural spread of TFDaV under EU conditions; - magnitude of the impact of TFDaV under EU conditions; - regulatory status of TFDaV as it is not explicitly named in Directive 2000/29/EC. Given the very limited available on this very recently described virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available		

Table 17.15: TOBACCO RINGSPOT VIRUS (TRSV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	TRSV is well characterised and diagnostic techniques are available	TRSV is well characterised and diagnostic techniques are available	No uncertainty
Absence/ presence of the pest in the EU territory (Section 3.2)	TRSV is reported from several MSs but its presence is restricted and/or under eradication	TRSV has been sporadically reported from several MSs in the EU but its presence is restricted and/or under eradication	Possible more significant presence in the EU
Regulatory status (Section 3.3)	TRSV is currently regulated in Annex IAI	TRSV is currently regulated in Annex IAI	No uncertainty
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	TRSV is able to enter in the EU. The <i>Malus</i> plants for planting pathway is only partially closed. In addition, entry is also possible on plants for planting of other hosts, on seeds of herbaceous hosts and with viruliferous nematodes. If TRSV were to further enter the EU territory, it could become established and spread	Plants for planting constitute the main means for long-distance spread for TRSV	<ul style="list-style-type: none"> - possible seed or pollen-mediated transmission mechanisms in woody hosts - efficiency of natural spread of TRSV under EU conditions - origin and trade volumes of plants for planting of unregulated host species - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> spp. and other hosts
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of TRSV would have a negative impact on the EU apple fruit industry and on other crops	Because of the negative impact of TRSV on host species would have a negative impact on their intended use	- The magnitude of the impact of TRSV under EU conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening of regulation (ban, request for certification) of plants for planting to cover imports of all hosts from all countries where TRSV is present and to cover other hosts, regulate seed import for susceptible species)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	TRSV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest, with the possible exception of the criterion on absence from the EU territory	TRSV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - possible seed- or pollen-mediated transmission mechanisms in woody hosts, - efficiency of natural spread of TRSV under EU conditions; - magnitude of the impact of TRSV under EU conditions; - possible more significant presence in the EU; - significance of the seed and pollen pathway given the absence of information on the volume of the imported commodities for <i>Malus</i> or for other hosts from countries where TRSV is present 		

Table 17.16: TOMATO RINGSPOT VIRUS (ToRSV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	ToRSV is well characterised and diagnostic techniques are available	ToRSV is well characterised and diagnostic techniques are available	No uncertainty
Absence/ presence of the pest in the EU territory (Section 3.2)	ToRSV has been reported from several MSs but its presence is restricted and/or under eradication	TRSV has been sporadically reported in the EU but its presence is restricted and/or under eradication	Possible more significant presence in the EU
Regulatory status (Section 3.3)	ToRSV is currently regulated in Annex IAI	TRSV is currently regulated in Annex IAI	No uncertainty
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	ToRSV is able to enter in the EU. The <i>Malus</i> and <i>Cydonia</i> spp. plants for planting pathway is essentially closed by specific legislation targeting ToRSV. However, entry is possible on plants for planting of <i>Cydonia</i> and of other hosts, on seeds of herbaceous hosts and with viruliferous nematodes. If ToRSV were to further enter the EU territory, it could become established and spread	Plants for planting, vectors, seeds and pollen constitute the main means for spread for ToRSV	<ul style="list-style-type: none"> - possible seed or pollen-mediated transmission mechanisms in woody hosts - efficiency of natural spread of ToRSV under EU conditions - origin and trade volumes of plants for planting of unregulated host species - significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of <i>Malus</i> and <i>Cydonia</i> spp. and other host
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of ToRSV would have a negative impact on the EU pome fruit industry and on other crops	Because of the negative impact of ToRSV on host species would have a negative impact on their intended use	- magnitude of the impact of ToRSV under EU conditions

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening of regulation (ban, request for certification) of plants for planting to cover imports of all hosts from all countries where TRSV is present and to cover other hosts, regulate seed import for susceptible species)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	ToRSV meets all the criteria evaluated by EFSA to qualify as a Union quarantine pest with the possible exception of the criterion on absence from the EU territory	ToRSV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: <ul style="list-style-type: none"> - possible seed- or pollen-mediated transmission mechanisms in woody hosts; - efficiency of natural spread of ToRSV under EU conditions; - magnitude of the impact of ToRSV under EU conditions; - significance of the seed and pollen pathway given the absence of information on the volume of the imported commodities for <i>Malus</i> and <i>Cydonia</i> spp. or for other hosts from countries where ToRSV is present 		

Table 17.17: TULARE APPLE MOSAIC VIRUS (TAMV)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (Section 3.1)	TAMV is well characterised and reliable diagnostic techniques are available	TAMV is well characterised and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/ presence of the pest in the EU territory (Section 3.2)	TAMV is not known to be present in the EU	TAMV is not known to be present in the EU. Therefore, TAMV does not meet this criterion to qualify as a potential Union RNQP	Possible unreported presence in the EU
Regulatory status (Section 3.3)	TAMV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	TAMV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'	TAMV not explicitly named in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Because it is no longer known to occur in nature, TAMV is most probably unable to enter in the EU	Plants for planting constitute the main mean for spreading for TAMV	Possible existence of TAMV in nature

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Potential for consequences in the EU territory (Section 3.5)	Introduction and spread of TAMV would have a negative impact on the EU pome fruit industry	Because of the negative impact of TAMV on host species, it would have a negative impact on their intended use as plant for planting	- susceptibility to and impact of TAMV on a range of apple varieties grown under EU conditions
Available measures (Section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU (e.g. tightening of regulation (ban, request for certification) to cover all Countries in which TAMV is known)	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (Section 4)	TAMV does not meet the criterion of being able to enter in the EU to qualify as a Union quarantine pest	TAMV is a non-EU virus (considered as regulated in Annex IAI of Directive 2000/29/EC as 'Non-European viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.'), and as such does not meet the EFSA criterion to qualify as a potential Union RNQP	
Aspects of assessment to focus on/ scenarios to address in future if appropriate	<p>The main knowledge gaps or uncertainties identified concern:</p> <ul style="list-style-type: none"> - possible existence of TAMV in nature; - regulatory status of TAMV as it is not explicitly named in Directive 2000/29/EC; - susceptibility to and impact of TAMV on a range of apple varieties grown under EU conditions. <p>Given the very limited available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data becomes available</p>		

References

- Allen WR, 1969. Occurrence and seed transmission of tomato bushy stunt virus in apple. *Canadian Journal of Plant Science*, 49, 797–799.
- Andino R and Domingo E, 2015. Viral quasispecies. *Virology*, 479, 46–51.
- Barba M, Ragozzino E and Faggioli F, 2007. Pollen transmission of Peach latent mosaic viroid. *Journal of Plant Pathology*, 287–289.
- Basso MF, da Silva JCF, Fajardo TVM, Fontes EPB and Zerbini FM, 2015. A novel, highly divergent ssDNA virus identified in Brazil infecting apple, pear and grapevine. *Virus Research*, 210, 27–33.
- Brown DJF, Halbrecht JM, Robbins RT and Vrain TC, 1993. Transmission Of Nepoviruses By Xiphinema-Americanum Group Nematodes. *Journal of Nematology*, 25, 349–354.
- CABI, 2018. CABI, current year. *Crop Protection Compendium*. Wallingford, UK: CAB International. Available online: www.cabi.org/cpc [Accessed: 7 September 2018 – 14 December 2018]
- Campbell R, 1996. Fungal transmission of plant viruses. *Annual Review of Phytopathology*, 34, 87–108.
- Chiumenti M, Navarro B, Venerito P, Civita F, Di Serio F and Minafra A, 2018. Molecular characterization of apple hammerhead viroid isolates from ancient Italian apple cultivars. *Book of Abstracts Viroids-2018 International Conference on Viroids and Viroid-Like RNAs*, 34.
- Cho IS, Kwon SJ, Yoon JY, Chung BN, Hammond J and Lim HS, 2017. First report of apple necrotic mosaic virus infecting apple trees in Korea. *Journal of Plant Pathology*, 99, 815–815.
- Desvignes J, 1976. The virus diseases detected in greenhouse and in field by the peach seedling GF 305 indicator. *Proceedings of the X International Symposium on Fruit Tree Virus Diseases*, 67, 315–323.

- Desvignes JC, Grasseau N, Boye R, Cornaggia D, Aparicio F, Di Serio F and Flores R, 1999. Biological properties of apple scar skin viroid: Isolates, host range, different sensitivity of apple cultivars, elimination, and natural transmission. *Plant Disease*, 83, 768–772.
- Di Serio F, Navarro B and Flores R, 2017a. Origin and Evolution of Viroids. In: Hadidi A, Flores R, Randles J, Palukaitis P (eds.). *Viroids and Satellites*. Academic press, London UK, pp. 125–134.
- Di Serio F, Torchetti EM, Flores R and Sano T, 2017b. Other Apscaviroids Infecting Pome Fruit Trees. In: Hadidi A, Flores R, Randles J, Palukaitis P (eds.). *Viroids and Satellites*. Academic press, London UK, pp. 229–241.
- Dombrovsky A, Pearlsman M, Lachman O and Antignus Y, 2009. Characterization of a new strain of Eggplant mottled crinkle virus (EMCV) infecting eggplants in Israel. *Phytoparasitica*, 37, 477–483.
- Domingo E, Sheldon J and Perales C, 2012. Viral quasispecies evolution. *Microbiology and Molecular Biology Reviews*, 76, 159–216.
- EFSA PLH Panel (EFSA Panel on Plant Health), 2013. Scientific opinion on the risks posed by *Prunus* pollen, as well as pollen from seven additional plant genera, for the introduction of viruses and virus-like organisms into the EU. *EFSA Journal* 2013;11(10):3375, 50 pp. <https://doi.org/10.2903/j.efsa.2013.3375>
- EFSA PLH Panel (EFSA Panel on Plant Health), 2018a. Scientific Opinion on the pest categorisation of *Xiphinema americanum* sensu lato. *EFSA Journal* 2018;16(7):5298, 43 pp. <https://doi.org/10.2903/j.efsa.2018.5298>
- EFSA PLH Panel (EFSA Panel on Plant Health), 2018b. Guidance on quantitative pest risk assessment. *EFSA Journal* 2018;16(8):5350, 86 pp. <https://doi.org/10.2903/j.efsa.2018.5350>
- EFSA PLH Panel (EFSA Plant Health Panel), Bragard C, Dehnen-Schmutz K, Gonthier P, Jacques M-A, Jaques Miret JA, Justesen A F, MacLeod A, Magnusson CS, Milonas P, Navas-Cortes J A, Parnell S, Potting R, Reignault P L, Thulke H-H, Van der Werf W, Vicent Civera A, Yuen J, Zappalà L, Candresse T, Chatzivassiliou E, Winter S, Chiumenti M, Di Serio F, Kaluski T, Minafra A and Rubino L, 2019. List of non-EU viruses and viroids of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L. *EFSA Journal* 2019;17(9). <https://doi.org/10.2903/j.efsa.2019.5501>
- EPPO (European and Mediterranean Plant Protection Organization), 2001. Diagnostic protocols for regulated pests. Tobacco ringspot nepovirus. *EPPO Bulletin*, 31, 45–51.
- EPPO (European and Mediterranean Plant Protection Organization), 2018a. EPPO Global Database. Available online: <https://gd.eppo.int> [Accessed: 7 September 2018 to 14 December 2018]
- EPPO (European and Mediterranean Plant Protection Organization), 2018b. EPPO Reporting Service. 2018 (11). Paris.
- EUROPHYT, 2018. Interceptions of harmful organisms in imported plants and other objects, annual Interception. Available online: http://ec.europa.eu/food/plant/plant_health_biosecurity/europhyt/interceptions/index_en.htm [Accessed: 18 September 2018]
- FAO (Food and Agriculture Organization of the United Nations), 1995. ISPM (International Standards for Phytosanitary Measures) No 4. Requirements for the establishment of pest free areas. Available online: <https://www.ippc.int/en/publications/614/>
- FAO (Food and Agriculture Organization of the United Nations), 2004. ISPM (International Standards for Phytosanitary Measures) 21—Pest risk analysis of regulated non-quarantine pests. FAO, Rome, 30 pp. Available online: https://www.ippc.int/sites/default/files/documents/1323945746_ISPM_21_2004_En_2011-11-29_Refor.pdf
- FAO (Food and Agriculture Organization of the United Nations), 2013. ISPM (International Standards for Phytosanitary Measures) 11—Pest risk analysis for quarantine pests. FAO, Rome, 36 pp. Available online: https://www.ippc.int/sites/default/files/documents/20140512/ispm_11_2013_en_2014-04-30_201405121523-494.65%20KB.pdf
- FAO (Food and Agriculture Organization of the United Nations), 2017. ISPM (International standards for phytosanitary measures) No 5. Glossary of phytosanitary terms. Available online: <https://www.ippc.int/en/publications/622/>
- Ghabrial S, BozaNiebert M, Maiss E, Lesker T, Baker T and Tao Y, 2012. Family *Partitiviridae*. In: King AMQAM and Carstens EB (eds). *Virus Taxonomy: Ninth Report of the International Committee on Taxonomy of Viruses*. Lefkowitz EJ Elsevier, Oxford. pp. 523–534.
- Gray S and Gildow FE, 2003. Luteovirus-aphid interactions. *Annual Review of Phytopathology*, 41, 539–566.
- Greber R, Teakle D and Mink G, 1992. Thrips-facilitated transmission of prune dwarf and prunus necrotic ringspot viruses from cherry pollen to cucumber. *Plant Disease*, 76, 1039–1041.
- Hadidi A, Barba M, Hong N and Hallan V, 2017. Apple Scar Skin Viroid. In: Hadidi A, Flores R, Randles J and Palukaitis P (eds.). *Viroids and Satellites*. Academic press, London UK, pp. 217–228.
- Hammond RW, 2017. Seed, Pollen, and Insect Transmission of Viroids. In: Hadidi A, Flores R, Randles J and Palukaitis P (eds.). *Viroids and Satellites*. Academic press, London UK, pp. 521–530.
- Ho T and Tzanetakis I, 2012. TaqMan qPCR detection of three berry fruit ilarviruses. pp. 53–53.
- Ito T and Yoshida K, 1998. Reproduction of apple fruit crinkle disease symptoms by apple fruit crinkle viroid. In XVII International Symposium Virus and Virus-Like Diseases of Temperate Fruit Crops 472, pp. 587–594.
- Jafarpour B and Sanfaçon H, 2009. Insertion of large amino acid repeats and point mutations contribute to a high degree of sequence diversity in the X4 protein of tomato ringspot virus (genus *Nepovirus*). *Archives of Virology*, 154, 1713.

- James D, 2011. Cherry rasp leaf virus. In: Hadidi A, Barba M, Candresse T and Jelkmann W (eds.). Virus and Virus-like Diseases of Pome and Stone Fruits. American Phytopathological Society Press, St. Paul, MN, USA. pp. 137–141.
- James D, Varga A, Jespersen GD, Navratil M, Safarova D, Constable F, Horner M, Eastwell K and Jelkmann W, 2013. Identification and complete genome analysis of a virus variant or putative new foveavirus associated with apple green crinkle disease. Archives of Virology, 158, 1877–1887.
- Kaponi M, Luigi M and Kyriakopoulou P, 2012. Mixed infections of pome and stone fruit viroids in cultivated and wild trees in Greece. New Disease Reports, 26, 8.
- Kaponi MS, Sano T and Kyriakopoulou PE, 2013. Natural infection of sweet cherry trees with apple scar skin viroid. Journal of Plant Pathology, 95, 429–433.
- Kishigami R, Yamagishi N, Ito T and Yoshikawa N, 2014. Detection of apple latent spherical virus in seeds and seedlings from infected apple trees by reverse transcription quantitative PCR and deep sequencing: evidence for lack of transmission of the virus to most progeny seedlings. Journal of General Plant Pathology, 80, 490–498.
- Klose M, Sdoodee R, Teakle D, Milne J, Greber R and Walter G, 1996. Transmission of three strains of tobacco streak ilarvirus by different thrips species using virus-infected pollen. Journal of Phytopathology, 144, 281–284.
- Koganezawa H and Ito T, 2011. Apple latent spherical virus. In: Hadidi A, Barba M, Candresse T and Jelkmann W (eds.). Virus and Virus-like Diseases of Pome and Stone Fruits. American Phytopathological Society Press, St. Paul, MN, USA. pp. 23–24.
- Kyriakopoulou P, Giunchedi L and Hadidi A, 2001. Peach latent mosaic and pome fruit viroids in naturally infected cultivated pear *Pyrus communis* and wild pear *P. amygdaliformis*: implications on possible origin of these viroids in the Mediterranean region. Journal of Plant Pathology, 51–62.
- Liang PB, Navarro B, Zhang ZX, Wang HQ, Lu MG, Xiao H, Wu QF, Zhou XP, Di Serio F and Li SF, 2015. Identification and characterization of a novel geminivirus with a monopartite genome infecting apple trees. Journal of General Virology, 96, 2411–2420.
- Makkouk K, Koenig R and Lesemann D, 1981. Characterization of a tomosvirus isolated from eggplant. Phytopathology, 71.
- Martelli G and Uyemoto J, 2011. Nematode-borne viruses of stone fruits. Virus and Virus-like Diseases of Pome and Stone Fruits, 161–170.
- Martin RR, MacFarlane S, Sabanadzovic S, Quito D, Poudel B and Tzanetakis IE, 2013. Viruses and virus diseases of *Rubus*. Plant Disease, 97, 168–182.
- Messmer A, Sanderson D, Braun G, Serra P, Flores R and James D, 2017. Molecular and phylogenetic identification of unique isolates of hammerhead viroid-like RNA from 'Pacific Gala' apple (*Malus domestica*) in Canada. Canadian Journal of Plant Pathology, 39, 342–353.
- Mink G, 1993. Pollen and seed-transmitted viruses and viroids. Annual Review of Phytopathology, 31, 375–402.
- Morelli M, Giampetruzzi A, Laghezza L, Catalano L, Savino VN and Saldarelli P, 2017. Identification and characterization of an isolate of apple green crinkle associated virus involved in a severe disease of quince (*Cydonia oblonga*, Mill.). Archives of Virology, 162, 299–306.
- Nakamura K, Yamagishi N, Isogai M, Komori S, Ito T and Yoshikawa N, 2011. Seed and pollen transmission of Apple latent spherical virus in apple. Journal of General Plant Pathology, 77, 48–53.
- Nibert ML, Ghabrial SA, Maiss E, Lesker T, Vainio EJ, Jiang DH and Suzuki N, 2014. Taxonomic reorganization of family *Partitiviridae* and other recent progress in partitiviridae research. Virus Research, 188, 128–141.
- Noda H, Yamagishi N, Yaegashi H, Xing F, Xie JP, Li SF, Zhou T, Ito T and Yoshikawa N, 2017. Apple necrotic mosaic virus, a novel ilarvirus from mosaic-diseased apple trees in Japan and China. Journal of General Plant Pathology, 83, 83–90.
- Osaki H and Sasaki A, 2018. A novel alphapartitivirus detected in Japanese pear. Virus Genes, 54, 149–154.
- Osaki H, Sasaki A, Nakazono-Nagaoka E, Ota N and Nakaune R, 2017. Genome segments encoding capsid protein-like variants of *Pyrus pyrifolia* cryptic virus. Virus Research, 240, 64–68.
- Osman F, Al Rwahnih M and Rowhani A, 2017. Real-time RT-qPCR detection of cherry rasp leaf virus, cherry green ring mottle virus, cherry necrotic rusty mottle virus, cherry virus A and apple chlorotic leaf spot virus in stone fruits. Journal of Plant Pathology, 99, 279–285.
- Pallas V, Aparicio F, Herranz MC, Sanchez-Navarro JA and Scott SW, 2013. The molecular biology of ilarviruses. In: Advances in Virus Research. Elsevier, 139–181.
- Pinkerton J, Kraus J, Martin R and Schreiner R, 2008. Epidemiology of *Xiphinema americanum* and Tomato ringspot virus on red raspberry, *Rubus idaeus*. Plant Disease, 92, 364–371.
- Poudel B, Laney AG and Tzanetakis IE, 2011. Epidemiological studies on Blackberry chlorotic ringspot virus. Phytopathology, 101, S145–S145.
- Poudel B, Ho T, Laney A, Khadgi A and Tzanetakis IE, 2014. Epidemiology of Blackberry chlorotic ringspot virus. Plant Disease, 98, 547–550.
- Ragozzino A, 2011. Hazel Mosaic. In: Hadidi A, Barba M, Candresse T and Jelkmann W (eds.). Virus and Virus-like Diseases of Pome and Stone Fruits. American Phytopathological Society Press, St. Paul, MN, USA. pp. 267–269.
- Raj S, Srivastava K, Aslam M and Singh B, 1988. Occurrence of a strain of eggplant mottled crinkle virus in *Solanum capsicastrum* in India. Plant Pathology, 37, 599–603.

- Raj S, Aslam M, Srivastava K and Singh B, 1989. Occurrence and identification of Eggplant mottled crinkle virus in India. *Journal of Phytopathology*, 125, 283–288.
- Rasoulpour R and Izadpanah K, 2008. First report of Eggplant mottled crinkle virus in geranium in Iran. *Plant Pathology*, 57, 397–397.
- Rivera L, Zamorano A and Fiore N, 2016. Genetic divergence of tomato ringspot virus. *Archives of Virology*, 161, 1395–1399.
- Rochon D, Lommel S, Martelli G, Rubino L and Russo M, 2012. Family *Tombusviridae*. In: King AMQ, Adams MJ, Carstens EB and Lefkowitz EJ (eds.). *Virus Taxonomy-Ninth Report on the International Committee on Taxonomy of Viruses*. Elsevier Academic Press, Cambridge, MA, USA. pp. 1111–1138.
- Rojas MR, Macedo MA, Maliano MR, Soto-Aguilar M, Souza JO, Briddon RW, Kenyon L, Rivera Bustamante RF, Zerbini FM and Adkins S, 2018. World Management of Geminiviruses. *Annual Review of Phytopathology*, 56, 637–677.
- Rowhani A, Daubert S, Uyemoto J, Al Rwahnih M and Fuchs M, 2017. American Nepoviruses. In: *Grapevine Viruses: Molecular Biology, Diagnostics and Management*. Springer, pp. 109–126.
- Russo M, Vovlas C, Rubino L, Grieco F and Martelli G, 2002. Molecular characterization of a tombusvirus isolated from diseased pear trees in southern Italy. *Journal of Plant Pathology*, 161–166.
- Sanfaçon H and Fuchs M, 2011. Tomato ringspot virus. In: Hadidi A, Barba M, Candresse T and Jelkmann W (eds.). *Virus and Virus-like Diseases of Pome and Stone Fruits*, American Phytopathological Society Press, St. Paul, MN, USA. pp. 41–48.
- Sdoodee R and Teakle D, 1993. Studies on the mechanism of transmission of pollen-associated tobacco streak ilarvirus virus by *Thrips tabaci*. *Plant Pathology*, 42, 88–92.
- Seo JK, Kim MK, Kwak HR and Choi HS, 2017. First Report of Blackberry chlorotic ringspot virus in Black Raspberry (*Rubus coreanus*) in Korea. *Plant Disease*, 101, 848–849.
- Serra P, Messmer A, Sanderson D, James D and Flores R, 2018. Apple hammerhead viroid-like RNA is a *bona fide* viroid: Autonomous replication and structural features support its inclusion as a new member in the genus *Pelamoviroid*. *Virus Research*, 249, 8–15.
- Shen P, Tian X, Zhang S, Ren F, Li P, Yu YQ, Li RH, Zhou CY and Cao MJ, 2018. Molecular characterization of a novel luteovirus infecting apple by next-generation sequencing. *Archives of Virology*, 163, 761–765.
- Singh D, Verma N and Varma A, 2008. The Fungal Transmitted Viruses. In: *Mycorrhiza*. Springer, 485–503.
- Sorrentino R, De Stradis A, Russo M, Alioto D and Rubino L, 2013. Characterization of a putative novel nepovirus from *Aeonium* sp. *Virus Research*, 177, 217–221.
- Stace-Smith R, 1985. Tobacco ringspot virus. *AAB Description of Plant Viruses*, 309. Available online: <http://www.dpvweb.net/dpv/showdpv.ph>
- Stace-Smith R and Converse R, 1987. Tomato ringspot virus in *Rubus*. *Agriculture handbook-United States Department of Agriculture, Combined Forest Pest Research and Development Program (USA)*.
- Szostek SA, Wright A and Harper S, 2018. First report of Apple hammerhead viroid in the US, Japan, Italy, Spain, and New Zealand. *Plant Disease*, 102, 2670.
- Walia Y, Dhir S, Bhadoria S, Hallan V and Zaidi AA, 2012. Molecular characterization of Apple scar skin viroid from Himalayan wild cherry. *Forest Pathology*, 42, 84–87.
- Walia Y, Dhir S, Zaidi AA and Hallan V, 2015. Apple scar skin viroid naked RNA is actively transmitted by the whitefly *Trialeurodes vaporariorum*. *RNA Biology*, 12, 1131–1138.
- Wang Y, Zhao Y and Niu J, 2012. Molecular identification and sequence analysis of the apple scar skin viroid (ASSVd) isolated from four kinds of fruit trees in Xinjiang province of China. *Mol. Pathogens*, 3, 12–18.
- Xing F, Robe BL, Zhang ZX, Wang HQ and Li SF, 2018. Genomic Analysis, Sequence Diversity, and Occurrence of Apple necrotic mosaic virus, a Novel Iilarvirus Associated with Mosaic Disease of Apple Trees in China. *Plant Disease*, 102, 1841–1847.
- Yang I, Deng T and Chen M, 1986. Sap-transmissible viruses associated with grapevine yellow mottle disease in Taiwan. *Chung-hua nung yeh yen chiu= Journal of agricultural research of China*.
- Zhang ZX, Qi SS, Tang N, Zhang XX, Chen SS, Zhu PF, Ma L, Cheng JP, Xu Y, Lu MG, Wang HQ, Ding SW, Li SF and Wu QF, 2014. Discovery of Replicating Circular RNAs by RNA-Seq and Computational Algorithms. *Plos Pathogens*, 10, e1004553
- Zhao Y and Niu JX, 2008. Apricot is a new host of Apple scar skin viroid. *Australasian Plant Disease Notes*, 3, 98–100.

Glossary

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 1995, 2017)
Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017)
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2017)

Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (FAO, 2017)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017)
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2017)
Measures	Control (of a pest) is defined in ISPM 5 (FAO 2017) as 'Suppression, containment or eradication of a pest population' (FAO, 1995). Control measures are measures that have a direct effect on pest abundance. Supporting measures are organisational measures or procedures supporting the choice of appropriate Risk Reduction Options that do not directly affect pest abundance.
Pathway	Any means that allows the entry or spread of a pest (FAO, 2017)
Phytosanitary measures	Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests (FAO, 2017)
Protected zones (PZ)	A Protected zone is an area recognised at EU level to be free from a harmful organism, which is established in one or more other parts of the Union.
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (FAO, 2017)
Regulated non-quarantine pest	A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party (FAO, 2017)
Risk reduction option (RRO)	A measure acting on pest introduction and/or pest spread and/or the magnitude of the biological impact of the pest should the pest be present. A RRO may become a phytosanitary measure, action or procedure according to the decision of the risk manager
Spread (of a pest)	Expansion of the geographical distribution of a pest within an area (FAO, 2017)

Abbreviations

DG SANTÉ	Directorate General for Health and Food Safety
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
HTS	high-throughput sequencing
ICTV	International Committee on Taxonomy of Viruses
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MS	Member State
NGS	next generation sequencing
PCR	polymerase chain reaction
PLH	EFSA Panel on Plant Health
PZ	Protected Zone
RNQP	Regulated non-quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

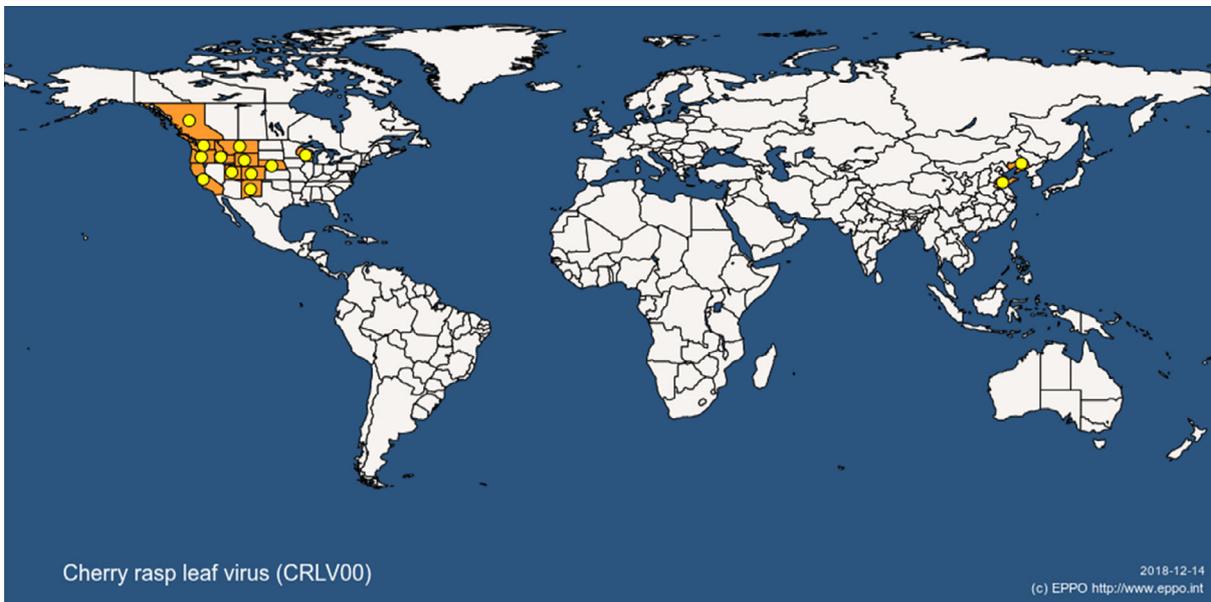
Appendix A – Distribution maps of viruses

A.1. Distribution map of Apple scar skin viroid (CABI, 2018)



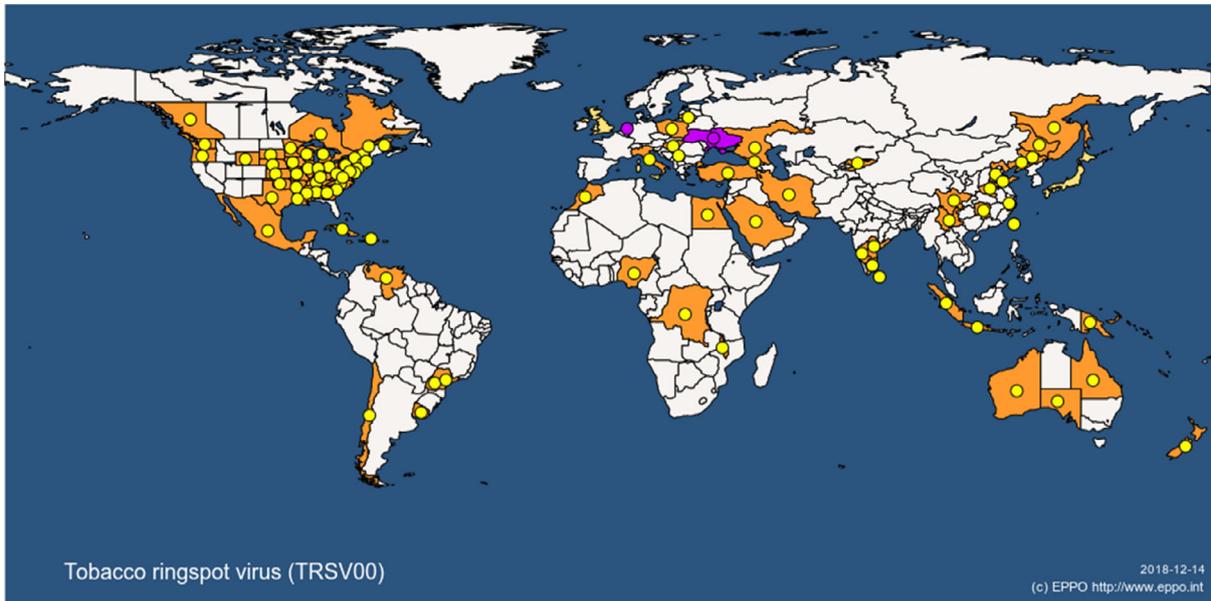
A.2. Distribution map of Cherry rasp leaf virus (EPP0, 2018a)

Colour code: Yellow and orange indicate reported presence of the pest.



A.3. Distribution map of Tobacco ringspot virus (EPPO, 2018a)

Colour code: Yellow and orange indicate reported presence and purple stands for reported transient presence of the pest.



A.4. Distribution map of Tomato ringspot virus (EPPO, 2018a)

Colour code: Yellow and orange indicate reported presence and purple stands for reported transient presence of the pest.

